

On Monday the 8th of June she was very uneasy, and appeared to me to be in considerable pain; I therefore kept a constant watch, and the man who had charge of her remained with her all night. She continued in this state until about twelve o'clock on Tuesday, at which time she produced the young one. It was born near the edge of the water, and in a few minutes after its birth, by rolling and turning about, was completely divested of the outer covering of *fur* and *hair*, which formed a complete mat, upon which the young animal lay for the first hour or two after its birth. When born it was very active, and within three hours afterwards was swimming and diving about in the water like an adult animal. It uttered a low soft *ba*, or single call-note, and looked about for its mother, and crawled towards her when she came out of the water. She turned upon her side in order to let it suck, and I had every reason to believe that all was going on well. The young Seal slept well, sometimes on its belly, sometimes on its side. The mother, however, appeared unwell and in great pain, and on the following day (Wednesday) suddenly plunged into the water and sunk to the bottom. Believing she was dying, I had her assisted out of the pond. She was in strong convulsions, and continued to roll and struggle until the next morning (this day) when she died. She appears to have had no milk. Finding the female unable to suckle her young one, I had it removed to the house and have fed it by means of a bottle with warm milk and a small quantity of cod-liver oil added to the milk.

The statement having been made that the species of Seal could be distinguished by the mode of shedding its first coat (I believe it is said that the common Seal, *P. vitulina*, sheds its coat as soon as born, while the *P. fatida* sheds its first coat before its birth), I beg to say that this supposed distinction is shown by the above remarks to be of no value whatever as a means of distinguishing the species. I have no doubt both species are alike in this particular; and I have no doubt, from what I have seen, that the outer fur is sometimes shed before birth and sometimes immediately after birth in both species alike.

This young Seal was 32 inches long, and weighed 20 lbs. at its birth.

The outer covering is now on the table. It appears to me that the young animal shedding its outer covering compensates for the absence of the licking generally bestowed upon young animals by their mother. The Seals never lick.

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June 25, 1868.

Dr. E. Hamilton, V.P., in the Chair.

Mr. P. L. Selater exhibited two heads of the Spanish Ibex (*Capra pyrenaica*, Schimper), which had been obtained by Major Howard Irby on the Sierra Hermosura near Marbella in Southern Spain,

and announced that that gentleman had procured at Gibraltar a young living specimen of this animal, which it was his intention to present to the Society's Menagerie.

Mr. Sclater read the following notices of the more important additions to the Society's Menagerie during the month of May:—

1. A pair of the Wild Ass of the Syrian deserts (*Equus hemippus* of the late Isidore Geoffroy St.-Hilaire), of much interest as rendering the Society's series of the living species of this group complete. This pair of animals had been obtained by exchange from the Jardin d'Acclimatation, Paris, on the 2nd of May.

2. A young male of the Regent Bird (*Sericulus chrysocephalus*), purchased on May 14th, being the first specimen of this remarkable bird that had reached the Society's Gardens alive. The Society's correspondent, Dr. F. Mueller of Melbourne, had previously forwarded a living example of this bird, which had, unfortunately, died in the vessel after it had reached the docks.

3. An African Fruit-Bat (*Cynonycteris collaris*) which had been captured at sea off the St. John's river, Natal, March 1st, 1868, and purchased the 27th of May. This animal had been placed in the Monkey-house along with the Indian Fruit-Bat (*Pteropus medius*), which had been living in the Society's Menagerie ever since October 1863.

A communication was read from Prof. R. Owen, F.R.S., containing a description of the sternum in *Dinornis elephantopus* and *D. rheides*, with notes on that bone in *D. crassus* and *D. casuarinus*, and forming the thirteenth part of his series of memoirs on the extinct birds of the genus *Dinornis*.

This paper will be published in the Society's 'Transactions.'

The following papers were read:—

1. Description of a New Species of the Genus *Ceyx*.

By JOHN GOULD, F.R.S. &c.

CEYX PHILIPPINENSIS, sp. nov.

This little Kingfisher might at first sight be considered the same as *Ceyx cyanopectus*, Eyton, but on comparing it with that species it will be found to differ in having a shorter bill, in the richer tone of the whole of its colouring, in having the patch of feathers on the sides of the neck larger and of a purer white, and in the absence of the dark indigo band; the flanks, too, are rufous, and not blue as in *C. cyanopectus*. Its form and colouring are those of a true *Ceyx*; but it has the patches of feathers on the upper part of each side of the breast very much developed, as in *Aleyone*, and more so than in any other species of the genus *Ceyx*. Upper mandible brownish black; lower mandible fleshy-brown; feet orange.

Total length  $5\frac{1}{4}$  inches, bill  $1\frac{5}{8}$ , wing  $2\frac{1}{2}$ , tail  $\frac{2}{3}$ , tarsi  $\frac{7}{15}$ .

*Hab.* Vicinity of Manila, Philippine Islands.

2. Notes on the History and Geographical Relations of the Pinnipedia frequenting the Spitzbergen and Greenland Seas. By ROBERT BROWN, F.R.G.S. &c.

[Communicated by Dr. Murie.]

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1. *Introduction.*

In the introduction to a former paper\* I had occasion to refer to the hazy uncertainty which surrounds the history of many of the Arctic Mammalia; preeminently is this true of the Cetacea, but scarcely less so of the order Pinnipedia. Though the specific determination of the species in this group is more easily managed, and has, to a great extent, been accomplished, yet the end to which these determinations are made, viz. the history of the birth, the life, and the geographical distribution and migrations of the animals themselves, are yet almost unknown, or dependent on the authority of the old Greenland naturalists, many of whose observations, made in a day when the specific characters were less known, or but a limited portion of the Arctic Ocean explored, have been proved to be far beside the truth. Again, these observations were made on the coast of Greenland where none of our sealers go; while in the Spitzbergen and Jan Mayen seas (the "Old Greenland" or "Greenland sea" of the whalers) the vast portion of the sealing of commerce is carried on for a few weeks each spring, but regarding the history of the Seals which form the prey of these hunters, the extent, commercial importance of the trade, and the migrations of these animals from one portion of the Arctic Sea to another we absolutely know nothing. Scientific purists forsooth (the Dr. Dryasdusts of zoology) may look upon the description of the process of a bone, or the elucidation of a dental tubercle, as the aim and end of all biological study; but I again repeat that all this, though of the utmost value, is merely an atom in the description of the animal, and mainly important so far as it tends to render the specific determination of the animals whose life we are studying easier to the field naturalist. I cannot help looking upon natural history as the history of nature; and to have a history of animated beings we must know something further about them than that the palate bone is notched, that the cervical vertebræ are anchylosed, or that the grinders have a posterior lobe.

It is with this view that these fragmentary notes have been put together. The various writers on this group, as far as relates to Arctic zoology, I have already criticised in my former paper, to which I beg leave to refer. In the spring of 1861, with a view to acquire a knowledge of the northern Seals of commerce, I accompanied a sealer

\* "On the Mammalian Fauna of Greenland" (P. Z. S. 1868, p. 330).

into the seas between Spitzbergen and Jan Mayen; that year, however, proved a partial failure, and we returned to England by the end of April, leaving immediately for Baffin's, on which voyage I also accompanied her. Dr. John Wallace, now of the Hudson's Bay Company's Service, during the previous year also made a similar voyage, but was fortunate enough to enjoy better opportunities of observing the habits of Seals than I did; for at the period when I left for Davis's Strait, he remained behind, and passed the whole summer in the sea between Spitzbergen, Jan Mayen, and the east coast of Greenland. On my arrival in England he put into my hands an excellent series of notes on these species of animals, part of which I communicated to the Royal Physical Society of Edinburgh in 1862, and of which an abstract was published in their 'Proceedings' for that year. At that time, having some intention of preparing a more extensive work, I reserved my own observations and a great portion of Dr. Wallace's until such time as this might be matured; besides, there were innumerable points in the history of the Seals which I was desirous of investigating before putting any of our observations before the world. However, shortly after this I left on a very long scientific journey, far from the scene of our former studies, and for more than four years the whole subject was laid aside. In the summer of 1867 I again found myself a sojourner as far north as 70° N. lat., in Danish Greenland. During this time I made a very extensive collection of the skeletons, skulls, &c. of these and other animals, besides adding to and correcting some of my former observations. That osteological collection is not yet examined; but this is the less important, because, so far as I was able to judge during the hasty examination it was possible to give them during the process of preservation, there are no new species among them. Moreover the craniological characteristics of the northern Pinnipedia, thanks to the labours of Nilsson, George and Frederick Cuvier, Blainville, Gray, Gaimard, Lilljeborg, and others, are now very satisfactorily determined; and what points are still *sub judice* can easily be settled by an appeal to the collections already in our Museum, and to the one formed by me when it is made accessible to science.

These notes are still very imperfect; but as my stay in England is uncertain, I think it only right, if they are of any value at all, that they should be published, reserving to myself the hope that at some future day I may be enabled to present a more complete monograph of the Pinnipedia. In the following notes are combined most of my own observations with selections from those of Dr. Wallace (distinguished by his name within parentheses when I have been unable to confirm the observation); and to keep up the continuity of remark I have been compelled to occasionally repeat the substance of a portion of the abstract formerly referred to\*. As this, however, has been misunderstood, I think that this partial review will not be objected to, especially as it merely consists of a few paragraphs. The remarks on the species are prefaced by some general observations on

\* Proceedings of the Royal Physical Society of Edinburgh, 1862, p. 312.

the group. For the reasons already stated, I have purposely omitted giving any craniological or other osteological distinctions, except in a few isolated cases, limiting what descriptive remarks I may have to make to some disputed points regarding the very fallacious distinctive marks derived from the skin. As in the previous paper, I have not attempted anything like a complete history of their habits, geographical distribution, &c., chiefly limiting my remarks to what has fallen within my own observation or knowledge. I have occasionally mentioned facts already known, but still requiring further confirmation; but in general, when I can add nothing to the remarks of other naturalists, a reference is made to their writings, such references being intended to convey the imputation that our observations are similar in their nature. The list of popular names attached to each species is the result of not a little work and extensive acquaintance among the seal-hunters and fishermen of the northern coasts. The scientific synonyms are only given when no doubt existed of their applicability, and are not intended to be a complete list.

## 2. *Physiological Remarks on the Habits of Seals.*

The Seal is, to a considerable extent, fitted for terrestrial progression, which it performs chiefly by the muscles of the trunk, aided by those of the extremities. The result is a rolling, waddling, or shuffling kind of motion—the animal leaning over on one anterior extremity, and then rolling back on the other to make a similar use of it, using them thus alternately and the muscles of the spine continuously, chiefly those of the lumbar region and *erectores spinæ*. In carnivorous animals the intestinal canal is shorter than in graminivorous species: yet there are exceptions; for the Sloth has a very short intestine, and the Seal a very long one. I have measured the length of the intestine of *Pagophilus grælandicus*, and found it to vary between 50 and 56 feet in length.

It is said that the livers of the Seals at Nova Zembla (Hemskirk) and in the southern seas possess poisonous properties: this is not the case with the livers of any of the Greenland seals; for they are often eaten, and I never knew of any bad effect ensuing. The lymphatic glands are well developed, the glands being of great size, though not numerous, it being common to find only one in each axilla and groin. In the young Seals the lymphatics of the neck are subject to disease, which appears to be analogous to, if not indeed true scrofula: the glands swell and suppurate and pour out a purulent discharge; and the animals subject to this do not increase in size.

Many theories have been adduced to account for the Seal's capability of remaining with impunity so long below water. That of Buffon and the physiologists of his time was long celebrated: from their finding the *foramen ovale* open in a few instances, they twisted an exception into a rule, and accounted for it by this fœtal peculiarity. Dr. Wallace considers that this theory is erroneous, and from numerous observations he is satisfied that the open foramen must be very rare; for in only one of the Seals which he examined did he

find the foramen ovale unenclosed to within a line of the aorta. That of Blumenbach and Houston has been also brought forward, viz. that venous sinuses are to be found in the liver and surrounding parts, and that the large veins have been observed to be enlarged and tortuous; these have been supposed to act as reservoirs for the returning venous blood while the animal is diving under the water. But this theory carries inconsistency in itself. The venous system on the whole, and not in any particular part, unless in the vena cava, from the pressure excited on its walls, is greatly enlarged; but this arises from the great quantity of blood these animals possess. But, even supposing these venous sinuses and that the animal will remain below the surface for twenty or twenty-five minutes (though I must assert that I never saw them remain longer below the surface than fifteen minutes, and from five to eight is the common time), are these sinuses large enough to contain the full quantity of blood that may return in that period from the capillary system? The reply is certainly in the negative. Does the heart's action diminish in rapidity or come to a full stop? in that case there would be no need of these sinuses. What, then, are the uses of them?

After a very careful examination, Dr. Wallace informs me that he never could find them, in all the Seals which he examined. He certainly remarked the dilated condition of the veins, but referred this to a physiological cause, viz. the pressure of the superincumbent column of blood. He believes that their power of remaining so long below the surface of the water is to be referred to a cause physiological, and not structural. Their expertness in swimming is not possessed from birth, but only developed from an innate instinct. He has often watched young Seals taking the water at first in smooth pools among the ice, and then swimming slowly and quietly about in the still floe-water—then gradually taking the water, staying below the water at first but a short time, gradually lengthening their stay until they had acquired the faculty of remaining the usual time beneath the surface. Dr. Wallace, then, thinks that this faculty is owing to a cause more physiological than anatomical, and that the explanation he has given, coupled with the enormous quantity of blood which the Seal contains, will account for their power of remaining beneath the water. As I have not examined the anatomy of the Pinnipedia with this object in view, I cannot presume to give an opinion on the matter; in the Narwhal and other Cetacea which I examined, the extensive venous plexus about the vertebral column seemed to explain the possession of this power of temporary subaquatic existence. The flesh of the Seal is quite black, from the enormous quantity of venous blood it is impregnated with; but if exposed to the air or steeped in water, it acquires the usual arterial rosy hue. The flesh of young seals which have not yet taken the water is, on the contrary, quite red.

### 3. *Habits and Instincts of Seals in general.*

They spend a considerable part of their time in feeding, but they

pass by far the greater part in basking in the sunshine and sleeping on the ice\*. It has been remarked that the Seal sleeps and wakes alternately about every 180 seconds. Seals are, however, often killed in considerable numbers when asleep on the ice; and this happens most commonly on a day of warm sunshine. We had a Seal on board about a month old, which I watched attentively for some time, and it certainly seemed to wake and sleep alternately with the interval mentioned (*Wallace*): when disturbed it made attempts to defend itself; and if left alone for a few seconds, it drew its flippers close to its sides, and gradually its head began to look drowsy, then closed its eyes, and from the long deep breathing it was evidently asleep, for a minute or two (for the time varied); and then, without being disturbed in any way, it would suddenly open its large black glassy eyes, stretch out its head, and look about, and, as if satisfied that all was right, would again relapse to sleep, and so on. When asleep, they always leave several sentinels on the watch, which, strange to say, are, for the most part, female Seals. These sentinels, however, conduct themselves in the same manner as I have described the individual Seal we had on shipboard. I have been assured by old seal-hunters that Seals can sleep on their back while floating in the sea; and this statement corroborates that of *Fabricius* and other naturalists. In 1861, in *Davis's Straits*, the steamer on which I was ran against a Seal sleeping in this manner. The *blow-holes*, or escape-holes, of the Seals are evidently formed by them when the ice is making, the animal always rising to breath again at the same place, thus preventing the coagulation of the ice, or breaking it as soon as formed. It has been supposed that the Seal could make such an opening by force or by *keeping its warm nose* (though, unfortunately for the theory, that organ is always cold!) *for a time at one place for the purpose of melting the ice*; but these conjectures are not founded on truth, the following reasons being my grounds for that statement:—It could not break the ice by force, and, moreover, it could not even dare to run its nose against such an obstacle; for the nose of the Seal is a tender point; this was known even to the ancients, and is referred to by *Oppian* in a well-known passage†. This is taken advantage of by the sealers, who secure as many as possible when they are hastening to the water from the ice, by striking them on the nose, and then killing them at their leisure when the others have escaped. Even suppose the muzzle capable of melting the ice (which it certainly is not), where could the animal rise to breath during the process? The preceding explanation of the formation of the breathing- or *blow-holes* was derived from independent observation of the habits of the Seal, but is identical with that given me by the natives of the Arctic regions. It is at such holes that the *Èskimo* and the Bear watch patiently for their prey.

\* "Sternunt se somno diversæ in littore Phocæ" (*Virgil, Georgics, lib. 4.*)

† "Non hami penetrant phoecas, sævique tridentes  
In caput inveniunt, et circum tempora pulsant.  
Nam subita pereunt capitis per vulnera morte."

The *voice* of the Seal is a peculiar cry, somewhat midway between that of a young child and the bleating of a lamb or kid.

They are very fond of music, which was well known to the ancients; and this fondness is often taken advantage of by the hunters at the present day\*. I have often seen them raising their heads inquiringly out of the water listening to the sea-songs of the sailors as they wrought at the pumps or tracked the ship to the ice-floe; therefore it seems as if the fabled spell of Orpheus, which was powerless on the Dolphin, takes effect upon the Seals. In moving from one place to another they swim rapidly, sometimes on their backs and often on their sides, occasionally whirling about as if to amuse themselves, and sometimes leaping out of the water altogether.

Their parental love is so great that they will sometimes remain and share the fate of their hapless young. Their instinctive knowledge of danger is very keen; they have been known to seize their young with their flippers and carry them into the water with them when they saw the hunter approaching! I did not see this myself, and only ask you to receive the statement for what it is worth.

Seals are very tenacious of life, and difficult to kill, unless by a bullet through the brain or heart. They are so quickly *flensed* †, that after having been deprived of their skin they have been seen to strike out in the water; so that the sympathies of the rough hunters have been so excited that they will pierce the heart several times with their knives before throwing away the carcass. These movements, however, are apparently reflex or diastaltic, as I have often seen a Seal lying skinned on the deck for an hour, exposed to a temperature of 12° below zero (Fahr.), and yet the muscles of the loins and back retain their contractility to such an extent as to be able to rotate the pelvis on the spine, on those on each side being alternately irritated.

With the exception of the Bladdernose, the other Seals in the Greenland seas appear to have little or no combativeness in their nature, but are a harmless, persecuted, sportive race of graceful athletes making merry the solitary waters of polar lands.

On the other hand, the male Bladdernose is, in truth, the lion of the sea, dividing the empire of the polar waters with his huge ally the Walrus. Instead of flying at the approach of the hunter, he will quite calmly await the approach of danger, preparing for defence by betaking himself to the centre of the piece of ice he is on, and blowing up the air-bladder on his forehead, while he rears his head and snuffs the air like an enraged bull, and often gives battle successfully,

\* It is often alluded to by the ancient poets (thus, "gaudebant carinine phocæ," Apol. Rhod. lib. 1; Val. Flacc. lib. 5. lin. 440, &c.); and all ancient historians especially note that it is "perstudiosum musicæ." The well-known passage in Sir W. Scott's poem also refers to this,—

"Rude Heiskars seals through surges dark  
Will long pursue the minstrel's bark."

† A convenient whaler's word (of Dutch origin) to express the operation of taking off the blubber (and skin).



making the clubs fly from the hands of his assailants, with his flippers, his head being protected as with a helmet by the air-bladder. He will then in turn act on the offensive, and put his opponents to flight, pursuing them with a shuffling serpent-like motion over the ice, the result often proving somewhat dangerous to the panic-stricken hunter if the boat has left that piece of ice, as the Seal will use his tusks rather ferociously when thus enraged. However, he is not inclined to give battle unless provoked, and looks a dull stupid-looking sort of epicurean as he lolls on the surface of the ice and gazes about with his large black eyes, having an apparently meaningless stare. The "Ground-Seal" and "the Floe-Rat" (*Pagomys hispidus*) in the far north are quite harmless and inoffensive; they apparently delight to swim about in the calm smooth floe-waters, or bask asleep in the sunshine on the surface of the ice. Their greatest enemy is the Polar Bear, who is continually on the alert to take them by surprise, forming, as they do, his chief prey.

Nearly all of the Seals live on the same description of food, varying this at different times of the year and according to the relative abundance or otherwise of that article in different portions of the Arctic seas. The great staple of food, however, consists of various species of Crustacea which swarm in the northern seas. During the sealing-season in the Spitzbergen sea I have invariably taken out of their stomachs various species of *Gammarus* (*G. sabini*, Leach, *G. loricatus*, Sab., *G. pinguis*, Kr., *G. dentatus*, Kr., *G. mutatus*, Lilljeb., &c.), collectively known to the whalers under the name of "Mountebank Shrimps," deriving the name from their peculiar agility in the water. This "seals' food" is found more plentiful in some latitudes than in others, but in all parts of the Greenland sea from Iceland to Spitzbergen; I have seen the sea at some places literally swarming with them. Again, in the summer in Davis's Strait I have found in their stomach remains of whatever species of small fish happened to be just then abundant on the coast, such as the *Mallotus arcticus*, *Salmo* (various species), &c. I have even known them to draw down small birds swimming on the surface; but their chief food is Crustacea and fish.

#### 4. Notes on the Species of *Pinnipedia*.

(1) CALLOCEPHALUS VITULINUS (Linn.), F. Cuv.

*Phoca vitulina*, Linn.

*Phoca communis*, Linn. (Mus. Ad. Frid. i. 5).

*Phoca canina*, Pall. (ad partem).

*Phoca variegata*, Nilss.

*Phoca linnæi*, Less.

*Phoca littorea*, Thienem.

Popular names.—*Sea-dog*, *Sea-calf*, *Sea-cat* (English sailors and fishermen generally); *Selkie*, *Selach*, and *Tangfish* (north of Scotland); *Rawn* (western islands of Scotland); *Språklig Skäl* (Swedish); in other parts of Scandinavia, and according to age &c., it is variously

designated *Wilkare Skül*, *Kubbsæl*, *Fjordnacke*, *den spüttede Sül* (the Spotted Seal), *Algar*, *Laggar*, *Kutar*, and *Skültokar*; *Kobbe*, *Stenkobbe* (Norse); *Hylje* (Finnish); *Nuorjo* (Lapp.); *Seehund* (German); *Veau marin* and *Phoque* (French); *Kassigiak* (Greenland); *Spragled Sælhund* (Danes in Greenland).

The Eskimo in Ponds Bay, on being shown a good figure of this Seal, called it *Tupalo*; but whether this is their name for the animal and is to be received for a proof that the *C. vitulinus* is found there, I cannot take upon myself to decide. The Greenlanders also call it, according to age, *Kassigiarak* and *Kassiginak*; but when it attains the age of three years, it is called *Kassiarsoak* ("the big Kassigiak"). Prof. Newton ("Notes on the Zoology of Spitsbergen," Proc. Zool. Soc. 1865, and Ann. Nat. Hist. vol. xvi. 3rd series, p. 423) says that *Pagomys fœtidus* is called *Steen Kobbe* (Stone-Seal) by the Spitzbergen hunters. I suspect that he has erred through his informants mistaking this for *Callocephalus vitulinus*. No doubt Dr. Malmgren seems to think that the latter species is not got in Spitzbergen—an opinion I have ventured to contest in a former paper.

It is also sometimes called "the Freshwater Seal," on account of its following the Salmon high up rivers\*.

*Remarks &c.*—Any laboured account of a Seal so long and so familiarly known would obviously be out of place in these short notes; I question, however, if all the accounts we possess regarding the Seal under the designation of "*Phoca vitulina*" really refer to this species, and not to *Pagomys fœtidus* and others †. It will, I think, be found that in the westeru and northern islands of Scotland several species, not hitherto supposed to be regular members of the British fauna, exist, known under the popular names of *Selkie*, *Selach*, *Sea-cat*, &c. I do not think I can say anything in regard to its habits further than what is already contained in various works on Mammalia &c., viz.:—Bingley, British Quadrupeds, p. 57; Bell, History of British Quadrupeds, p. 282; Hamilton, Amphibious Carnivora (Nat. Lib.), p. 127; James Wilson in Mag. Zool. and Bot. vol. i. p. 239; Edmonston, View of Zetland, vol. ii. p. 293; Martin, Western Islands, p. 62; M'Gillivray, British Quadrupeds (Nat. Lib.), vol. xiii. p. 199; Nilsson, Skandinaviske Fauna, i. p. 276; Fabricius, Naturhistoriske Selskabets Skrifter, I. Band ii. p. 98; Cœdman, Vet. Akad. Handl. 1784, p. 84; Rosted, Norske Vidensk. Nye Skrifter, ii. p. 185 (good description); Cneiff, "Berättelse om Skäl fångtet i Cæsterbotten," in Vet. Akad. Handl. 1759, p. 179. r. 8 (on the hunt); Holmers, Anteckningar om sätet att

\* I have known a Seal (probably *Halicyon richardsi*, Gray) to be killed at the Falls of the Columbia River in Oregon, upwards of 200 miles from the Pacific. It was doubtless in pursuit of Salmon. Dog River, a tributary of the Columbia, takes its name from a dog-like animal, probably a Seal, being seen in the lake whence the stream rises.

† In the Appendix to Parry's 'Voyage' is a notice of a Seal said to be "*Phoca vitulina*." It is the young (in second coat) of *Pagophilus grønlandicus*, which has often been mistaken for this Seal. It can be known by its having the second toe of the fore flippers the longest; while, independently of other characters, *C. vitulina* has the first toe the longest.

skjuta och fänga Skälar &c. (Stockholm, 1828)\* (hunt &c.); Ball, Transactions of the Royal Irish Academy, xviii., and Sketches of British Seals; Gaimard, Voyage en Islande &c.

*Procreation and Young.*—On the coast of Greenland it is said to produce its young in the month of June; but the time seems to vary according to season and place. On our coast its young is dark-coloured; but on the Arctic coasts it is born white, with curly hair, like the young of *Pagomys fœtidus*.

*Geographical Distribution.*—This is a Seal peculiar to the coasts of the regions which it affects, but has also a wide range, being found over nearly all the northern coasts of Europe and the colder portions of America. It is even said to be found in the Caspian Sea and Lake Baikal. It does not seem, from its littoral habits, to be found in the Spitzbergen sea, or form a portion of the commerce of the sealer; it is, however, found on the coasts of Spitzbergen, tolerably abundant on the eastern shores of Greenland, and in Davis's Strait. It is to be found all the year round all along the coast of Greenland up inlets †, but not to any such extent as *Pagomys fœtidus* and *Pagophilus greenlandicus*. In Scandinavia it is sometimes called the Fjardskäl on account of its frequenting inlets or fjords.

*Economic value and hunting.*—We have no data to decide as to what extent it is killed in Danish Greenland, its record being united with that of *Pagomys fœtidus*. The skins are highly valued as articles of dress, more especially as material for the women's breeches; and no more acceptable present can be given to a Greenland damsel than a skin of the *Kassigiak*. While a European Pyramis presents jewels and *bijouterie* to his fair Thisbe, the not less gallant Pingatok in Greenland presents to his squat *innamorata* the fruits of his hunt up the ice-choked fjord, in the form of a Seal of this species! In the Danish settlements they are valued at from three to four rigsdaler. The principal reason which induced the late Admiral Gräah's boatwomen to accompany him on his memorable voyage along the east coast of Greenland was the hope of obtaining some *Kassigiak* skins from that region, the natives of which value them at even less than the more serviceable hides of the other species, which are sold by the west-coast natives for a mere trifle. According to Hr. Cneiff (*l. c.*) a *C. vitulinus* will yield about  $6\frac{2}{3}$  Swedish lispunds of blubber, and, according to Holmers, even 8 lispunds. Professor Nilsson says that a Seal of this species killed on the coast between Malmö and Skanör in Sweden yielded over 90 Swedish "potts" of oil, each "pott" being worth 36 skillings, = 67 rigsdaler 24 skillings Rigmont (Swedish) for the oil of one *C. vitulinus*. In August, when the Seals are poorer, another yielded 75 potts, equal in value to 56 rigsdaler 12 skillings (Swedish). In some of the northern and western islands of Scotland, and at the estuary of the Tay, &c., they are still occasionally hunted for their skins and oil. The skin makes excellent leather, and waiscoats made of it are much valued by fishermen.

\* *Fide Nilss.*

† The "Colonie" of Christianslaab in Disco Bay is called *Kassigianwitchz*, or the place of the *Kassigiak*.

No separate returns of the catch of this have been kept; but it is estimated that of *Pagomys fœtidus* and *Callocephalus vitulinus*, the yearly capture in Danish Greenland must amount to 70,000\* or more. The flesh is looked upon in Greenland as the most palatable of all "seal-beef."

(2) *PAGOMYS FÆTIDUS* (Müll.), Gray.

*Phoca fœtida*, Müll.

*Phoca hispida*, O. Fab. Nat. Selskab. Skrifter, vol. i. 2. p. 74.

*Phoca bothnica*, Gm.

*Phoca fasciata*, Shaw.

*Phoca annellata*, Nilss.

*Phoca discolor*, Gray.

*Phoca frederici*, Less.

Popular names.—*Ringlad Skül* (Nilsson); *Morunge* (Edmann, Vet. Akad. Handl. 1784, p. 84); *Hringanor* (Mohr, Isl. Naturhistoriske, p. 5); *Kuma* (Tungunsen near Baikal); ?*Nerpa* (Russ.); (*Neitsiak* (young) and *Neitsik* (old, pronounced *Nesik*, Greenlanders and Danes in Greenland); *Floe-rat* or *Flaar-rat*† (of Northern English and Scotch sealers). It has been so often confounded with other Seals that, even on the coasts where it is not uncommon, it has not received many popular names; however, in different parts of the Scandinavian seaboard it is variously called *Inskürsskül* or *Skürfving*, and *Svart nollad-sül*, or simply the *Nollade*. This is, in all probability, the Seal known in the Hebrides as the *bodach* or old man.

It is doubtful if this is the *Phoca equestris* of Pallas; but I cannot think that there is any serious room for doubt that it is identical with Dekay's *Phoca concolor*. I do not think that any one now entertains any doubt about its being identical with the *Phoca fœtida* of Fabricius (Fauna Grœnl. p. 13. no. 8) or the *Phoca hispida* described by the same author in the 'Naturhistoriske Selskabets Skrifter,' *l. c.*, though Nilsson seemed in 1847 to have been doubtful (Skand. Fauna, i. p. 283).

*Descriptive remarks &c.*—This is the smallest of the Greenland Seals; it is chiefly looked upon and taken as a curiosity by the whalers, who consider it of very little commercial importance, and call it the "Floe-rat," as it is always either found on floes or quietly swimming about in the smooth floe-waters.

*Young.*—The young is white, of the yellowish tint of the Polar Bear. The hair is curly.

*Habit &c.*—They delight to live in retired bays in the neighbourhood of the ice of the coasts, and seldom frequent the open sea. In the Greenland and Spitzbergen seas they chiefly live upon the floes in retired situations at a considerable distance from the margin of the ice. Dr. Wallace observed them for a considerable time in

\* Rink, *l. c.*

† I have heard the English sailors call them *Dorrities*; but this term is also used for the Bluebacks (*P. grœnlandicus*).

the months of June and July, between N. lat.  $76^{\circ}$  and  $77^{\circ}$ , in possession of a large floe, part of which was formed of bay ice, where they had their "blow-holes" (the *atluk* of the Danes); his ship lay ice-bound for nearly three weeks, at about three miles from this large floe, and hence he had considerable opportunity of observing them. They passed the greater portion of their time apparently asleep beside their holes; and he never saw them all at one time off the ice, unless alarmed by parties from the ship or by the Polar Bear. When the ice slackened away and the sheets of open water formed around the ships, the Seals used to swim near them; and occasionally at these times a few were killed. In the water they are very cautious, swimming near the hunter, gazing on him as if with feelings of curiosity and wonder; but on the ice beside their blow-hole it is almost impossible for the hunter to approach them, so much are they on the alert and so easily alarmed. In Davis's Strait it especially feeds about the base of icebergs and up the ice-fjords. The great ice-fjord at Jakobshavn is a favourite haunt of theirs; the reason for this predilection is apparently that their food is found in such localities in greater abundance. The bergs, even when aground, have a slight motion, stirring up from the bottom the Crustacea and other animals on which the Seals feed\*; the native, knowing this, frequently endangers his life by venturing too near the icebergs, which not unfrequently topple over upon the eager Seal-hunter.

The old males have a most disgusting smell, which has suggested the name *fœtida*†.

*Geographical Distribution &c.*—In the Spitzbergen sea they appear to be confined to high latitudes, and especially to the parallels of  $76^{\circ}$  and  $77^{\circ}$  N.; and it is in these latitudes that the whalers chiefly find them. In Davis's Strait it is to be found all the year round, but particularly up the ice-fjords. Its capture constitutes the most important feature of the Seal-hunt in North Greenland; but many are also killed in South Greenland, the Neitsik figuring largely in the trade-returns of that Inspectorate. In Jakobshavn bay, I am told, they are quite numerous about the middle of August.

*Economic value.*—They are extensively captured for food and clothing. Notwithstanding the nauseous smell of the old ones, the flesh of all of them (but especially the younger individuals) is sufficiently palatable to an *educated* taste. During the latter end of summer and autumn it forms the principal article of food in the Danish settlements, and on it the writer of these notes and his companions dined many a time and oft; we even learned to like it and to become quite epicurean connoisseurs in all the qualities, titbits, and dishes of the well-beloved Neitsik! The skin forms the chief

\* Hr. Distrikts-læge Pfaff, who has resided at Jakobshavn for many years as district Medical Officer of North Greenland, suggests this to me; and the idea recommends itself as being that of a very intelligent naturalist.

† Homer refers to this in another species (probably *Monachus albiventer*):

“Web-footed Seals forsake the stormy swell,  
And sleep in herds exhaling nauseous smell.”

material of clothing in North Greenland. All of the *οἱ πολλοί* dress in Neitsik breeches and jumpers; and we sojourners from a far country soon encased ourselves in the somewhat *hispid* but most comfortable Neitsik unmentionables. It is only high dignitaries, such as "Herr Inspektor," that can afford such extravagance as a Kassigiak (*Callocephalus vitulinus*) wardrobe! the Arctic *belles* monopolize them all.

(3) *PAGOPHILUS GRÆNLANDICUS* (Müll.), Gray.

*Phoca grænlandica*, Müll.

*P. oceanica*, Lepech.

*Callocephalus oceanicus*, Less.

*Phoca semilunaris*, Bodd.

*P. dorsata*, Pallas.

*P. mülleri*, Less.

*Callocephalus grænlandicus*, F. Cuv.

Young. *Phoca lagura*, Cuv.

*Callocephalus lagurus*, F. Cuv.

*Phoca albicauda*, Desm.

*P. desmarestii*, Less.

*P. pilayi*, Less.

Popular names.—*Saddleback* (English northern sealers); *White-coats* and *Bed Lampiers* (Newfoundland sealers) (young); *Harp Seal* (English authors); *Svartsida* (Norse); *Dølja*, *Dævok*, *Aine* (Lapp); *Svartsiden* (Danish, hence Egede, Græn. p. 62); *Blaudruselur* (Icelandic); *Karoleek* and *Neitke* (Eskimo at Pond's Bay, Davis's Strait); *Atak* (Greenlanders). The same people, according to the age of the Seal, call it *Atarak*, *Aglektok* or *Uklektok*, and *Atarsoak* (hence Crantz, Grönl. i. p. 163), meaning respectively the little Seal (white), the blueside, and the large Seal, while *Atak* means merely *the Seal* (blackside) without reference to age. A variety having the belly dark also is called by the Danes in Greenland *Svart-svart-siden*. The *Uklektok* of the natives is also called by the whites *Blaa-siden* (the blueside). I shall afterwards refer to some of its other names.

There seems little doubt that the *Phoca oceanica*, Lepech.\*, is identical with this species; indeed Lepechin's description is one of the best we have of the *Pagophilus grænlandicus*. Lepechin seems to have confounded with this the young of another species, and to have erred by trusting wholly to the deceptive characters of colouring, instead of relying for its distinctive character on the more stable distinction of teeth and skull. What he says about the changes of coat in *P. oceanica* exactly agrees with what I have said regarding the present species.

*Remarks*.—It seems to be almost unknown to most writers on this group that the male and female of the Saddleback are of dif-

\* In Sir Joseph Banks's copy of Fabricius's 'Fauna,' in the British Museum, "*Phoca oceanica*" is written (apparently in Sir Joseph's handwriting) opposite the description of *Phoca grænlandica*.

ferent colours; this, however, has long been known to the Seal-hunters. *Male*.—The length of the male Saddleback rarely reaches 6 feet, and the most common length is 5 feet; while the female in general rarely attains that length. The colour of the male is of a tawny grey, of a lighter or darker shade in different individuals, on a slightly straw-coloured or tawny-yellowish ground, having sometimes a tendency to a reddish-brown tint, which latter colour is often seen in both males and females, but especially in the latter, in oval spots on the dorsal aspect. The pectoral and abdominal regions have a dingy or tarnished silvery hue, and are not white as generally described. But the chief characteristic, at least that which has attracted the most notice, so much as to have been the reason for giving it several names, from the peculiar appearance it was thought to present (*e.g.* “harp” Seal, “saddleback,” &c.), is the dark marking or band on its dorsal and lateral aspects. This “saddle-shaped” band commences at the root of the neck posteriorly, and curves downwards and backwards at each side superior to the anterior flippers\*, reaches downwards to the abdominal region, whence it curves backwards anteriorly to the posterior flippers, where it gradually disappears, reaching further in some individuals than in others. In some this band is broader than in others and more clearly impressed, while in many the markings only present an approximation, in the form of an aggregation of spots more or less isolated. The grey colour verges into a dark hue, almost a black tint, on the muzzle and flippers; but I have never seen it white on the forehead as mentioned by Fabricius. The muzzle is more prominent than in any other northern Seal.

*Female*.—The female is very different in appearance from the male: she is not nearly so large, rarely reaching 5 feet in length; and when fully mature her colour is a dull white or yellowish straw-colour, of a tawny hue on the back, but similar to the male on the pectoral and abdominal regions, only perhaps somewhat lighter. In some females I have seen the colour totally different; it presented a bluish or dark grey appearance on the back, with peculiar oval markings of a dark colour apparently impressed on a yellowish or reddish-brown ground. These spots are more or less numerous in different individuals. Some Seal-hunters are inclined to think this is a different species of Seal from the Saddleback, because the appearance of the skin is often so very different and so extremely beautiful when taken out of the water; yet as the females are always found among the immense flocks of the Saddleback, and as hardly two of the latter females are alike, but varying in all stages to the mature female, and on account of there being no males to mate with them, I am inclined to believe with Dr. Wallace that these are only *younger female Saddlebacks*. The muzzle and flippers of the female present the same dark-chestnut appearance as in the male.

*Procreation and changes of coats in the young*.—I have already

\* I use this very convenient sealers' vernacular term to express the “paws,” “hands,” &c. of systematic authors.

spoken of the young as being different from the male; and in my remarks upon their geographical distribution and migrations reference will be made generally to their period and place of procreation, more theoretically, however, than from actual knowledge or observation. I now supply this from a study of this subject in the Spitzbergen sea. The period at which the Saddlebacks take to the ice to bring forth their young may be stated generally at between the middle of March and the middle of April, according to the state of the season &c., the most common time being about the end of March. At this time they may be seen literally covering the frozen waste as far as the eye can reach with the aid of a telescope, from the "crow's nest" at the main-royal mast-head, and have, on such occasions, been calculated to number upwards of half a million of males and females. After the females have procured suitable ice on which they may bring forth their young, the males leave them and pursue their course to the margin of the ice; there the Seal-hunters lose them, and are at a loss as to what course they take, the common opinion being that they leave for feeding-banks; but where, is unknown. They most probably direct their course along the "cant" of the ice, or among the ice where it has a loose scattered character; for in the month of May sealers fall in with the old Seals (male and female) in about from N. lat.  $73^{\circ}$  to  $75^{\circ}$ , and in the following month still further north, by which period the young ones have also joined them. The females commonly produce one at a birth, frequently two; and there is good reason for supposing that there are occasionally three, as most sealers can tell that they have often seen three young ones on a piece of ice floating about which were apparently attended by only one female. Yet it is only proper to remark that, of the several ships I have heard of finding the seals when taking the ice, none of the hunters have been able to tell me that they took more than two from the uterus of the mother\*. In contradiction to the opinion of some experienced sealers, I think that it is more than probable that they produce but once a year.

(a) The colour after birth is a pure woolly white, which gradually assumes a beautiful yellowish tint when contrasted with the stainless purity of the Arctic snow; they are then called by the sealers "white-coats" or "whitey-coats"†; and they retain this colour until they are able to take the water (when about fourteen or twenty days old). They sleep most of this time on the surface of the snow-covered pack-ice and grow remarkably fast. At this stage they can hardly be distinguished among the icy hummocks and the snow—their colour thus acting as a protection to them; for in this state they

\* Perhaps, after all, Pliny has struck the truth in regard to the order, when he says, "*Parit nunquam geminis plures*" (Hist. Nat. lib. 9. § 13).

† These are rarely seen in Danish Greenland, and then are called "Isblink" by the Danes from their colour; at least, so Fabricius says. He, moreover, informs us that the third year they are called *Aglektok* (as mentioned above), the fourth *Millaktok*, and after a winter *Kinaglit*, when they are beginning to assume the harp-shaped markings of the male (Nat. Selsk. Skrift. i. p. 92). I never heard these names in North Greenland.



are perfectly helpless, and the sealer kills them with a blow of the sharp-pointed club or a kick over the nose with his heavy boot. The mother will hold by her young until the last moment, and will even defend it to her own destruction. I have known them seize the hunter when flaying the young one, and inflict severe wounds upon him. In 1862, during a severe gale of wind many of the young seals were blown off the ice and drowned. Sometimes the sealing-ships have accidentally fallen among them during the long dark nights of the end of March or beginning of April, and were aware of their good luck only from hearing the cries of the young Seals. The white-coat changes very quickly. In 1862 the late Capt. George Deuchars, to whom science is indebted for so many specimens, brought me two alive from near Jan Mayen; they were white when brought on board, but they changed this coat to a dark one completely on the passage, of a week or ten days. They ate fresh beef, and recognized different persons quite readily. The young "whitecoat" represented on the plate of *Phoca barbata* by Dr. Hamilton ("Amphibious Carnivora," Naturalist's Library, vol. viii. pl. 5), from a specimen in the Edinburgh Museum, is not the young of that species, but of *Pagophilus grœnlandicus*. The young white-coat, however, is much plumper than the specimen figured; indeed, in proportion to its size, it has much more blubber between the skin and the flesh than the adult animal.

(β) They take the water under the guidance of the old females. At the same time the colour of the skin begins to change to that of a dark speckled and then spotted hue; these are denominated "Hares" by the sealers\*.

(γ) This colour gradually changes to a dark bluish colour on the back, while on the breast and belly it is of a dark silvery hue. Young Seals retain this appearance throughout the summer and are termed "Bluebacks" by the sealers of Spitzbergen, "Aglektok" by the Greenlanders, Blaa-siden by the Danes†.

(δ) The next stage is called Millaktok by the Greenlanders. The Seal is then approaching to its mature coat, getting more spotted, &c., and the saddle-shaped band begins to form.

(ε) The last stage (in the male to which these changes refer) is the assumption of the halfmoon-shaped mark on either side, or the "saddle" as it is called by the northern sealers.

I consider that about three years are sufficient to complete these changes. This is also the opinion held in Newfoundland, though the Greenland people consider that five years are necessary. I wish, however, to say that these changes do not proceed so regularly as is usually described, some of them not lasting a year, others longer, while, again, several of the changes are gone through in one year; in fact the coats are always gradually changing, though some of

\* In this state it is not unlike *Halichærus grypus*, but can be distinguished by the characters given by Nilsson, Skand. Fauna, i. p. 301.

† The dental formula of a Seal in this stage killed by me in Davis's Strait, September 1861, was:—Incisors  $\frac{6}{4}$ ; canines  $\frac{1-1}{1-1}$ ; molars  $\frac{5-5}{5-5}$ .

the more prominent ones may be retained a longer, and others a shorter time. It would require a very careful and extended study of this animal to decide on this point, which, owing to their migrations, it is impossible to give. After all, these changes and their rapidity vary according to the season and the individual, and really will not admit of other than a general description.

*Habits.*—It has few other characteristic habits beyond what is mentioned regarding the order generally, or in other sections of this paper on its migrations &c. It is looked upon by the Greenlanders as rather a careless, stupid Seal, easily caught by a very ordinary *kayaker*. Its food consists of any small fish (*Mallotus arcticus*, Fab., &c.), Crustacea, and even Mollusca. In this its habits agree with those of other species.

*Geographical range and migrations.*—The Saddleback has a wide range, being found at certain seasons of the year in almost all parts of the Arctic Ocean, from the American coasts to Nova Zembla, and perhaps even further; it appears that the *Phoca oceanica* (Lepechin, Acta Petropolitana, 1777, t. i. pp. 1, 259, t. 6, 7) is identical with it. Stragglers even find their way into temperate regions; and this is so frequently the case that this Seal may now be classed in the fauna of nearly all of the northern shores of Europe and America. The period of the year influences its position in the Spitzbergen sea (the Greenland sea of the Dutch, the “Old Greenland” of the English whalers). Early in March it is found by the sealing-ships in immense numbers in the proximity of the dreary island of Jan Mayen\*, off the east coast of Greenland, not far from the 72nd parallel of north latitude; but, of course, the longitude varies with the extent which the ice stretches out to the eastward, though the common meridian is between 6° and 8° west of Greenwich. They are never found far inwards on the fixed ice, but on the margin of the icebelt which extends along the whole of the eastern shores of Greenland, stretching as far as the longitude of Iceland, and sometimes even for a hundred miles to the eastward of that island and of Jan Mayen island into the ocean. The general direction of its sea-margin is towards the north-east, stretching most commonly as far as Spitzbergen, to N. lat. 80°, but occasionally only to about 75° N. lat., where it joins at an angle another belt of ice which lies in a southern and eastern direction along the coast of Spitzbergen to Cherrie Island. This easterly belt of ice is what the whalers call a “south-east pack;” and at the angle where the two belts join, a passage can generally be accomplished through to the Spitzbergen waters. The nature of the ice, which can easily be perceived by the experienced sealer, determines whether the Seals will be found far from the margin of the ice. Thus, if there is much new light ice, it is probable that the Seals will have taken the ice at a considerable distance from the seaboard margin of the pack, as it is well known that instinctively

\* Hence the Norse sealers often call it the *Jan Mayen Kobbe* (the Jan Mayen Seal), but more often the *Springer*, from its gambolling motions in the water (Newton, *l. c.*).

they select ice of a strong consistence for the safety of their young when in that helpless condition in which they are unable to take to the water. Again, they often take the ice where it stretches out to sea in the form of a long, broad promontory, with apparently this end in view, that their young may easily get to sea when able to do so; this is the great clue which guides the sealer in the choice of the ice where he may find his prey. This was very well exhibited in 1859. Dr. Wallace tells me that there was very little ice that year, and the island of Jan Mayen was altogether free from it; indeed the nearest ice lay away nearly 70 miles or more to the north-west of it. The 'Victor,' the 'Intrepid,' and a fleet of other ships met with indications of Seals in  $72^{\circ}$  N. lat., about eighty miles in a north-westerly direction from Jan Mayen, in the early part of the month of April; they had sailed in an easterly direction through a very loose pack of very heavy ice. The prospects were so good that Capt. Martin, sen., of the 'Intrepid,' perhaps the most successful sealer who ever sailed in the Greenland sea, and Capt. Anderson, of the 'Victor' (my old fellow voyageur both in the North Atlantic and North Pacific Oceans), were congratulating each other on the almost certain prospect of filling their ships (for, indeed, the old Seals had taken the ice and some had already brought forth their young), when suddenly there was a change of wind to the eastward, and before many hours it blew a hard gale from that direction. The results were that the ice was driven together into a firm pack and frozen into solid floes, and the 'Victor' and many of the best ships of the fleet got ice-bound. The Seals shifted their position towards the edge of the ice to be nearer the sea, and for seven weeks the 'Victor' was beset among ice and drifted southwards as far as N. lat.  $67^{\circ} 15'$ , having described a course of nearly 400 miles. Though I have stated the parallel of  $72^{\circ}$  N. lat. as being the peculiar whereabouts of the Seals in March, yet they have often been found at a considerable distance from it as well from Jan Mayen. Thus in 1859 they were found in considerable numbers not far from Iceland, the most northerly point of which is in N. lat.  $66^{\circ} 44'$ ; this leads me to remark that the Seals are often divided into several bodies or flocks, and may be at a considerable distance from each other, although it is most common to find these smaller flocks on the skirts or at no great distance from the main body. After the young have begun to take the water in the Spitzbergen sea, they gradually direct their course to the outside streams, where they are often taken in considerable numbers on warm sunny days. When able to provide for themselves, the females gradually leave them and join the males in the north, where they are hunted by the sealers in the months of May and June; and it is especially during the latter month that the females are seen to have joined the males; for at the "old-sealing" (as this is called) in May, it has often been remarked that few or no males are seen in company with the females. Later in the year, in July, there are seen, between the parallels of  $76^{\circ}$  and  $77^{\circ}$  N., these flocks of Seals, termed by Scoresby "Seals' weddings;"

and I have found that they were composed of the old males and females and the *bluebacks*, which must have followed the old ones in the north and formed a junction with them some time in June. There is another opinion, that the old females remain and bring their young with them north; but all our facts are against such a theory (*Wallace*).

These migrations may vary with the temperature of the season, and are influenced by it; it is possible that in the Spitzbergen sea as the winter approaches they keep in advance of it and retreat southward to the limit of perpetual ice, off the coast of Greenland, somewhere near Iceland, where they spend the winter. We are, however, at a loss regarding the winter habits of these Seals in that region; here no one winters, and there are no inhabitants to note their migrations and ways of life. Different is it, however, on the Greenland shores of Davis's Strait, where in the Danish settlements the Seals form, both with the Whites and Eskimo, the staple article of food and commerce, and accordingly their habits and arrival are well known and eagerly watched. The *Atarsoak*, as it is commonly called by the Eskimo, the "Svartsidede Sælhund" (Black-sided Sealhound) of the Danes, is the most common Seal in all South Greenland. It is equally by this Seal that the Eskimo lives, and the "Kongl. Grönlandske Handel" make their commerce. In South Greenland when the Seal generally is talked of, or a good or bad year spoken about, everybody thinks of this Seal; on the other hand, in North Greenland *Pagomys foetidus* and *Callocephalus vitulinus*\* are the most common. These last two species are the only Seals which can be properly said to have their home in Greenland, affecting ice-fjords and rarely going far from the coast. This is not the case with *P. groenlandicus*; at certain times of the year they completely leave the coast; therefore the Seal-hunting in South Greenland is more dependent upon contingencies than in North Greenland. This Seal arrives regularly in September in companies travelling from the south to north, keeping among the islands; occasionally at this time individuals detach themselves from the drove and go up the inlets. The Seal at this period is fatter, and continues so until the winter time. In October and November is the great catching, lessening in December. Very few are seen in January, and in February almost none; but regularly towards the end of May they return to the south of Greenland, and in June further north. The Seal is at this time in very poor condition, and remains for the most part in the fjords. For the second time they disappear in July, again to return regularly in September†. It is therefore seen that this Seal regularly comes and goes twice a year.

\* I was always under the impression that this Seal was rather rare; but as the return of its capture is not given separately from the former, it is impossible to say accurately.

† This varies a little with latitude &c.; e. g. this Seal leaves the vicinity of Jakobshavn ice-fjord about the middle of July or beginning of August, and comes back in October very fat. In August and September there are none on that part of the coast.

Every one knows when it commences its migration from the south to the north, but nobody knows where the Seal goes to when it disappears off the coast. Between the time they leave the coast in the spring and return in the summer they beget their young; and this seems to be accomplished on the pack-ice a great distance from land\*, viz. in the Spitzbergen sea. It is at this period that the Seal-ships come after them, as referred to already. Of course a few stragglers occasionally do not leave the coast, and produce their young close to the land; but such exceptions do not at all affect the rule laid down. It is a very familiar fact that round the Spitzbergen seas in April the sealers get the best catch. At this season they accumulate in immense numbers on the pack and can be killed *en masse*; but Dr. Rink cannot believe that in this time the Seals could migrate from the west coast of Greenland to Spitzbergen, the distance being too great. In support of this argument, it is pointed out that in the winter the Seal goes in the opposite direction to that of Spitzbergen, and cannot be seen in the northern parts of Davis's Strait or Baffin's Bay; it is possible therefore, he thinks, that the Seals of Baffin's Bay go in the spring down the west side of Davis's Strait to Newfoundland and Labrador, and supply the bulk of those killed there at that season, that in the winter they cross Davis's Strait and beget their young in that region, and after this cross again to the southern portion of Greenland. One would think that if the Seals came from Spitzbergen there would at this season be great numbers met on the passage round Cape Farewell. At other seasons of the year it is certainly the abundance or otherwise of their food which determines which way the Seal will take. In June the Seals go to feed on fish up the fjords; but what way they go in July, and where they may be in August, is still a matter of doubt. It is often argued in Greenland that in the "old times" Seals were more numerous than now, and that the great slaughter by the European sealers in Spitzbergen and Newfoundland has decreased their numbers on the shores of Greenland. The worthy Inspector of south Greenland therefore rejoices that the recent failures of the Seal-hunting in the former localities will have a tendency to again increase their numbers in Davis's Strait and Baffin's Bay, and thereby bring an increase of prosperity to his hyperborean subjects.

*Economic value and hunting.*—To the Greenlander this Seal is of vast importance for its oil, flesh, and hide. One full-grown animal will weigh on an average about 230 lbs., of which the skin and blubber weigh 100 lbs., and the meat 93 lbs., the remainder being the head, blood, and entrails. The edible parts may therefore be said to reach the amount of 100 lbs.; but this weight also includes the bones. The blubber of one at the latter part of the year would probably fill about one-third of a cask, but would not yield over a fourth part of that quantity when the animals return in the spring after procreating. The yearly catch in the Danish settlements is estimated at 36,000†.

\* Rink, *lib. cit.*, et O. Fabricius in Nat. Selsk. Skrift. *l. c.*

† *Fide* Rink, *l. c.*

(4) *PHOCA BARBATA*, O. Fab.*Callocephalus barbatus*, F. Cuv.*Phoca leporina*, Lepech. ?*Callocephalus leporinus*, F. Cuv.

Popular names.—*Hafert skül* (Swedish)\*; *Ajne* (Lapp); *Ursuk* (so written by Fab., but in north Greenland always pronounced *oo-sook*)† (Greenland). It is also called *Takamugak*; but I never heard the term applied; so that it must be rarely used.

What the "great Seals" of Pennant and other authors are has yet to be investigated; they were originally all set down to be this species, but are now generally supposed to belong to the Grey Seal (*Halichoerus grypus*). The skeleton in the Edinburgh museum at once decides that the *Haaffish* of Shetland and Orkney, which Dr. Fleming referred to *P. barbata*, belongs to the former species. The male is there called the "Bullfish." The *Tapvaist* of the western islands of Scotland appears also to belong to that species, *H. grypus* being a common Seal among the Hebrides.

*Descriptive remarks &c.*—Next to the Walrus this is the largest species of the order found in the northern seas. Perhaps, however, *H. grypus* may occasionally be found to equal it in size.

*Geographical distribution &c.*—This species has been so often confounded with the Grey Seal (*H. grypus*) and the Saddleback (*P. groenlandicus*) in different stages and coats, that it is really very difficult to arrive at anything like a true knowledge of its distribution. In a note at the end of the notice of this species I shall have something to say regarding the probability of its identity with the Ground-Seal of the English Seal-hunters of the Spitzbergen sea. On the coast of Danish Greenland it is principally caught in the district of Julianshaab a little time before the Klapmyds. It is not, however, confined to South Greenland, but is found at the very head of Baffin's Bay, and up the sounds of Lancaster, Eclipse, &c. branching off from the latter sea. The Seals seen by the earlier navigators being nearly always referred in their accounts to either *Phoca vitulina* or *P. groenlandicus* renders it at present almost impossible to trace its western range; it is, however, much rarer in the north than in the south of Davis's Strait. Accordingly the natives of the former region are obliged to buy the skin from the natives of the more southern settlements, as it is of the utmost value to them. This Seal comes with the pack-ice round Cape Farewell, and is only found on the coast in the spring. Unlike the other Seals, it has no *atluk*, but depends on broken places in the ice; it is generally found among loose broken ice and breaking-up floes.

*Economic value &c.*—This animal is of great importance to the Eskimo; they cut the skin into long strips for harpoon-lines—a *sine*

\* Newton (*l. c.*) says that this is the Seal known to the Norse hunters about Spitzbergen as the *Stor-kobbe* (Great Seal), and less seldom *Blaa-kobbe* (the Blue Seal).

† *Oosook* also means blubber. The name may possibly refer to the size or fatness of the animal, and mean "the *big, fat Seal*."

*quâ non* of every *kayak*. Out of every hide can be got four or five lines; and these are cut in a circular form off the animal before it is skinned; after this the lines are dried. These *allunaks* are very strong, and are applied to all sorts of purposes in Greenland travelling. The blubber is more delicate in taste than any other, and is accordingly more prized as a culinary dainty, when such can be afforded. There are only from 400 to 600 caught annually (*Rink, l. c.*).

Talking with Spitzbergen sealers, I used to hear much about the "Ground-Seal," which formed a part of their prey. I was, however, unfortunate enough not to meet with a specimen, the spring of my visit to those seas being what is called "a bad sealing-year;" and subsequently during my various voyagings in Davis's Straits and Baffin's Bay I failed to find one which could be pronounced to be the "Ground-Seal" of the Seal-hunters. I find, again, among Dr. Wallace's notes, very particular mention made of this species; and he seems to consider it distinct from all other species found in the Northern seas, and distinguishes it by the MS. name of *Phoca grœnlandica major*. It does not appear that he was acquainted with *P. barbata*; or, at least, it is not mentioned among his otherwise exact memoranda. What I learned regarding it agrees very closely with what he has said about it; I therefore will quote from his manuscript *verbatim*:—

"*Phoca grœnlandica major*. It is the 'Ground-Seal' of the sealers. Like the last-mentioned species [*Pagomys fœtidus*] few of them are taken by the sealers; and they are mostly seen by the Spitzbergen whalers in high latitudes, especially from the parallel of 76° N. lat. as far as Spitzbergen itself. The length of the male is about eight feet, and the female upwards of six feet. The colour and peculiar markings of the male very much resemble those of the male Saddleback; but in appearance it is more robust and of greater girth for its length, while upon the whole the shade of its colour is darker and yellowish, or coppery colour, more distinct. The full-grown female also, to a certain extent, corresponds to the female Saddleback, but with her colour of a deeper tawny yellow. Two females which I saw killed had still the dark-chestnut hue on the back which characterizes the younger Seals, but in addition had the peculiar round and oval spots of a still deeper shade impressed on a yellowish ground; it seems probable that they were in a transition stage in regard to colour, and that the tawny yellow would gradually gain predominance as they advanced in age towards maturity. Lepechin describes a Seal which frequents the White and Spitzbergen seas which bears a great resemblance to the female of this species; in fact his description of the *Phoca leporina*, or 'Hare of the Sea' of the Russians, almost identifies it with the Ground-Seal (female). The habits of the *P. grœnlandica major* and the localities it frequents very clearly differ from those of *P. grœnlandica*, Müll., which, as above mentioned, with the exception of size, it so much resembles. Its most common retreat is on the floe and fixed ice. I have seen herds, numbering upwards of two or three hundred, lying at their ease close besides their 'blow-holes,' down which they would immediately

dive when the hunter attempted to approach them. Occasionally they come to the borders of the ice, as in 1859 a few were secured in N. lat.  $79^{\circ}$  on a heavy stream of ice, and in about lat.  $75^{\circ}$  and  $76^{\circ}$  I have seen considerable numbers in the bottom of deep 'bights' of the ice lying on the 'sailing ice;' and, indeed, in open years, when ships can penetrate through towards Shannon Isle and the 'west land' (the east coast of Greenland), these localities are found to be peculiarly frequented by the 'Bladdernose' and 'Ground-Seals.'"

I should scarcely have hesitated to identify this Seal with *Pagophilus groenlandicus*, had not Dr. Wallace so expressly stated that it is not that species; and the whalers, who are very familiar with the "Saddleback," have not only distinguished it from that species, but applied a very familiar distinctive name to it. It is just possible that it is the *Phoca leporina* of Lepechin, which is usually classed as a synonym of *Phoca barbata*, O. Fab. (though it ought to be remarked that in such a case Lepechin's name ought to take priority of Otho Fabricius's, the one having been applied in the year 1778, while the other was not published until 1780), or that *Phoca leporina* is a good species—a conjecture which without skulls it is impossible to be certain of. Wallace does not mention the saddle-shaped mark on the back of the male (nor do my notes mention it as being found) of the Ground-Seal; so that the principal stumblingblock is removed to its being classed with *Phoca barbata*. Lepechin, no doubt (*Acta Acad. Scient. Imp. Petropol.* 1778, vol. iv. p. 264, tabb. viii., ix.), says that there are no spots on his Seal; but Wallace remarks that these may go off as the animal increases in age. At all events it is a subject of regret that a skull, which would have at once settled the point, was not brought. Leaving England very shortly after receiving these notes, and arriving home myself, I was unable to obtain a specimen. Again this spring, on taking up the subject of the Greenland Seals anew, I was so puzzled with this "Ground-Seal" that I had determined to make a short trip to the Spitzbergen sea again with a view to obtaining specimens, but, owing to an unforeseen accident, could not accomplish my purpose. I have, however, been promised that next year specimens shall be brought me. My experience, however, of these promises does not lead me to build any great expectations thereon; however, until that time at least, the specific determination of the "Ground-Seal" must, I fear, remain in abeyance.

(5) *HALICHÆRUS GRYPUS*, O. Fab.

*Phoca grypus* (den Krumnudede sæl), O. Fab.

*Halichærus griseus*, Nilss.

*Halichærus grypus*, Nilss.

*Phoca gryphus*, Licht.

*Phoca halichærus*, Thienem.

*Phoca thienemanni*, Less. (young).

*Phoca scopulicola*, Thienem. (young, *fide* Gray).

Popular names.—*Grey Seal* (English naturalists); *Graskül* (or *Grey Seal* of the Scandinavian naturalists); *Ståtskül* (*Edm. l. c.*);



*Graskül* (Swedish); *Sjöskül*, *Utskürsskül*, and *Krumnos* (various Scandinavian local names); *Tapvaist?* (western islands of Scotland); *Haaffish* (northern islands of Scotland).

*General remarks.*—The Grey Seal has no doubt been frequently confounded with other species, particularly *Phoca barbata* and the female of *Pagophilus grælandicus*.

It does not seem to frequent the high seas, though possibly this species may be confounded with the "Ground-Seal" and some forms of the "Saddleback." It is said to produce on the coast of Sweden in February, and to have one pup at a birth, of a white colour, which attains the dark-grey colour of the adult species in about fourteen days. In 1861, a little south of Disco Island, we killed a Seal the skull of which proved it to be of this species; and again this summer I saw a number of skins in Egedesminde and other settlements about Disco Bay which appeared to be of this species. Though the natives do not seem to have any name for it, the Danish traders with whom I talked were of opinion that the *Graskül*, with which they were acquainted as an inhabitant of the Cattedgat, occasionally visited South and the more southerly northern portions of Greenland with the herds of *Atak* (*P. grælandicus*).

The skull to which I refer, though carefully examined at the time, was afterwards accidentally destroyed by a young Polar Bear, which formed one of our ship's company on that northern voyage; therefore, though perfectly convinced of its being entitled to be classed as a member of the Greenland fauna, I am not in a position to assert this with more confidence than as being a very strong probability. It should be carefully looked for among the herds of *P. grælandicus* when they arrive on the coast. Its hunting forms nowhere an important branch of industry; it is, however, killed on the Scandinavian coasts, at various places, where it is most abundant. A large Grey Seal about eight feet in length will yield (the Swedes say) about 12 lispunds of blubber, equal in value to 36 rigsdaler banco (Swedish); and the hide, which is as large as an ox-hide, will bring the value of such a Seal up to the sum of 60 rigsdaler banco (Swedish)\*. I have seen and examined this Seal in various collections, and have seen it alive on the coasts of the Cattedgat, &c., and among the northern islands of Scotland, but can add nothing of additional value to the excellent account of Nilsson in his 'Skandinaviske Fauna' (Forsta Delen, Däggdjuren, 1847), pp. 298-310.

(6) *TRICHECHUS ROSMAREUS*, Linn.

*Trichechus rosmarus*, Linn.

*Rosmarus arcticus*, Pall.

*Trichechus obesus* et *T. divergens*, Ill. (*vide* Gray).

*Odobænus rosmarus* (L.), Sundeval, Uebers. der Verhandl. der Akad. der Wiss. 1859, p. 441.

\* In the kjøkkenmødding of Denmark, in company with remains of the *Castor fiber* and *Bos primigenius* are found those of *Halichærus grypus*, showing it to have been at one time sufficiently abundant to form part of the food of the primitive inhabitants of Scandinavia.

Popular names.—*Sea-horse* (English sailors); *Walrus* and *Morse* (Russ., English naturalists and authors); *Hvalross* (Swedish and Danish); *Havhest* (Sea-horse) and *Rosmar* (Norse); *Morsk* (Lapp); *Awük* (Greenlanders and Eskimo generally): this word is pronounced *āōōk* and (like many savage names of animals) is derived from the peculiar sound it utters, a guttural *āōōk!* *āōōk!*

*General descriptive remarks.*—The general form of the Walrus is familiar enough. However, specimens in museums and the miserably weebegone cubs which have been already twice brought to this country but poorly represent the Walrus in its native haunts. The skin of the forehead (in stuffed specimens) is generally dried to the skull; while in the live animal it is full, and the cheeks tumid. The skin of old animals is generally wrinkled and gnarled. I have seen an old Walrus quite spotted with leprous-looking marks consisting of irregular tubercular-looking white cartilaginous hairless blotches; they appeared to be the cicatrices of wounds inflicted at different times by ice, the claws of the Polar Bear, or met with in the wear and tear of the rough-and-tumble life a Sea-horse must lead in N. lat. 74°. The very circumstantial account of the number of mystachial bristles given in some accounts is most erroneous; they vary in the number of rows and in the number in each row in almost every specimen. They are elevated on a minute tubercle, and the spaces between these bristles are covered with downy whitish hair. I have seen several young Walruses in all stages, from birth until approaching the adult stage, and never yet saw them of a black colour, and should have been inclined to look upon as unfounded the statement that they are so, had it not been for the high authority of its author\*. All I saw were of the ordinary brown colour, though, like most animals, they get lighter as they grow old. Neither are the muffle, palm, and soles “hairy when young;” in one which I examined before it was able to take the water I saw no difference between it and its mother in this respect. The Walrus appears to cast its nails; for in several which I examined about the same time (viz. in August) most of the nails which had been developed were gone, and young ones beginning to appear. The dentition has been examined by Mc Gillivray †, Rapp ‡, Owen §, Peters ||, &c.; so that I need only touch upon that. In an aged male which I examined at Scott’s Inlet, Davis’s Strait, August 3, 1861, the small fifth molar on the right side of the upper jaw still remained, but loose; on the other side the corresponding alveolus was not yet absorbed.

Shaw (Gen. Zool. i. p. 234) has figured two species of this animal, and inferred their existence principally from the differences in the representations given by Johnston and Cook. Curiously enough, Pontopiddan tells us that the Norwegian fishermen in his day had

\* Gray, Cat. Seals and Whales in Brit. Mus. 2nd ed. p. 36.

† *Loc. cit. antea.*

‡ Bull. Sc. Nat. xvii. p. 280.

§ Proc. Zool. Soc. 1853, p. 103.

|| Monatsber. der Akad. der Wiss. zu Berlin, Dec. 1864, p. 685; transl. Annals Nat. Hist. xv. (3rd series) p. 355.

an idea that there were two species. The whalers declare that the female Walrus is without tusks; I have certainly seen females without them, but, again, others with both well developed. In this respect it may be similar to the female Narwhal, which has occasionally no "horn" developed; I do not think, however, that there is more than one species of Walrus in the Arctic regions or elsewhere.

*Habits and food.*—On the floes, lying over soundings and shoals, the Walruses often accumulate in immense numbers, and lie huddled upon the ice. More frequently, in Davis's Strait and Baffin's Bay, they are found floating about on pieces of drift ice, in small family parties of six or seven; and I have even seen only one lying asleep on the ice. Whether in large or small parties, one is always on the watch, as was long ago observed by the sagacious Cook: the watch, on the approach of danger, will rouse those next to them; and the alarm being spread, presently the whole herd will be on the *qui vive*. When attacked, unlike the other Seals (unless it be the *Cystophora*), it will not retreat, but boldly meet its enemies. I was one of a party in a boat which harpooned a solitary Walrus asleep on a piece of ice. It immediately dived, but presently arose, and, notwithstanding all our exertions with lance, axe, and rifle, stove in the bows of the boat; indeed we were only too glad to cut the line adrift and save ourselves on the floe which the Walrus had left, until assistance could reach us. Luckily for us the enraged Morse was magnanimous enough not to attack its chop-fallen enemies, but made off grunting indignantly, with a gun-harpoon and new whale-line dangling from its bleeding flanks. Its *atluk* or breathing-hole is cleanly finished, like that of the Seals, but in much thicker ice, and the radiating lines of fracture much more marked\*. The food of the Walrus has long been a matter of dispute, some writers, such as Schreber, Fischer, and others, going so far as to deny its being carnivorous at all, because Fischer saw in the stomach of one "long branches of seaweed, *Fucus digitatus*;" and Mr. Bell seems even to doubt whether the small number of grinding-teeth, and more especially their extreme shortness and rounded form, are not rather calculated to bruise the half-pulpy mass of marine vegetables than to hold and pierce the fish's scaly cuirass. I have generally found in its stomach various species of shelled Mollusca, chiefly *Mya truncata*, a bivalve very common in the Arctic regions on banks and shoals, and a quantity of green slimy matter which I took to be decomposed Algæ which had accidentally found their way into its stomach through being attached to the shells of the Mollusca of which the food of the Walrus chiefly consists. I cannot say that I ever saw any vegetable matter in its stomach which could be decided to have been taken in as food, or which could be distinguished as such. As for its not being carnivorous, if further proof were necessary I have only to add that whenever it was killed near where a Whale's carcass had been let

\* There are many interesting details of the habits of the Walrus in Kane's 'Arctic Explorations' and 'First Griinnel Expedition,' in Hayes's 'Boat Journey' and 'Open Polar Sea,' and in Belcher's 'Last of the Arctic Voyages.'

adrift its stomach was invariably found *crammed* full of the *krang* or flesh of that Cetacean. As for its not being able to hold the slippery cuirass of a fish, I fear the distinguished author of 'The British Mammalia' is in error. The Narwhal, which is even less fitted in its want of dentition for an ichthyophagous existence, lives almost entirely upon platicthyoid fishes and Cephalopoda. Finally the *experimentum crucis* has been performed, in the fact that fish have been taken out of its stomach; and a most trustworthy man, the captain of a Norwegian sealer, has assured me (without possessing any theory on the subject) that he has seen one rise out of the water with a fish in its mouth\*. In its stomach I have often seen small stones or gravel; and round its *atluk* considerable quantities are always seen: this is a habit which it possesses in common with *Phoca barbata* and even *Beluga catodon*. These stones may be taken in accidentally, but still they may serve some purpose in its digestive economy.

Next to man, its chief enemy is the Polar Bear. The Eskimo used to tell many tales of their battles; and though I have never been fortunate enough to see any of these scenes, yet I have heard the whalers give most circumstantial accounts of the Walrus drowning the Bear, &c. These accounts may be taken merely for what they are worth; but still this shows that they are not wholly confined to Eskimo fable, and ought therefore not to be hastily thrown aside. There is no doubt, however, that the Bear and the Walrus are (like all the Pinnipedia) but indifferent friends. Another pest I believe I discovered upon this animal for the first time, in 1861, in the shape of two undescribed species of *Hæmatopinus*, one invariably infesting the base of the mystachial bristles, and the other its body. I also found the Seals of Davis's Strait much troubled with another species (*Hæmatopinus phocæ*, Lucas) †. I have seen the Walrus *awuking* loudly on the ice, tumbling about, and rushing back from the water to the ice, and from the ice to the water, and then swimming off to another piece, and repeating the same operation as if in pain. A few hours afterwards I saw a flock of *Saxicola ænanthe* (it was on a land-floe, close to the Fru Islands) alight on the spot. On going over, I found the ice speckled with one of these species of *Hæmatopinus*, on which the birds had been feeding; and the unfortunate Walrus seems to have been in the throes of clearing itself of these troublesome friends, after the approved fashion. Subsequently I have seen these and other small birds alight on the back of the Walrus to peck at these insects, just as crows may be seen sitting on the backs of cattle in our fields. Its tusks it apparently uses to dig up the molluscous food on which it chiefly subsists; and I have seen it also use them to drag up its huge body on to the ice. In moving on shore it aids its clumsy progression by their means.

\* The young specimen which died this spring in the Society's Gardens was in a very poor condition, and afforded but an indifferent notion of the lion-like *Awuk* which destroyed our boat in Scott's Inlet.

† Proc. Roy. Phys. Soc. Edin. 1863.

The Walrus, being an animal of considerable cerebral development, is capable of being readily domesticated. For many years past the Norwegians have frequently brought specimens to different Scandinavian ports; and two have reached England, and survived a short time. More than a century ago one of these animals reached England. De Laet\*, quoting from Edward Worst, who saw one of them alive in England which was three months old and had been brought from Nova Zembla, says:—"Every day it was put into water for a short time, but it always seemed happy to return to dry ground. It was about the size of a calf, and could open and shut its nostrils at pleasure. It grunted like a wild Boar, and sometimes cried with a strong deep voice. It was fed with oats and millet, which it rather sucked in than masticated. It was not without difficulty that it approached its master; but it attempted to follow him, especially when it had the prospect of receiving nourishment at his hand." Its naturalization in our Zoological Gardens having therefore become a subject of considerable interest, I cannot better conclude these notes on the habits of the Walrus than by describing a young one I saw on board a ship in Davis's Strait, in 1861, and which, had it survived, was intended for the Zoological Society.

It was caught near the Duck-Islands off the coast of North Greenland, and at the same time its mother was killed; it was then sucking, and too young to take the water, so that it fell an easy prey to its captors. It could only have been pupped a very few hours. It was then 3 feet in length, but already the canine tusks were beginning to cut the gums. When I first saw it, it was grunting about the deck, sucking a piece of its mother's blubber, or sucking the skin which lay on deck, at the place where the teats were. It was subsequently fed on oatmeal and water and pea-soup, and seemed to thrive upon this *outré* nourishment. No fish could be got for it; and the only animal food which it obtained was a little freshened beef or pork, or Bear's flesh, which it readily ate. It had its likes and dislikes, and its favourites on board, whom it instantly recognized. It became exceedingly irritated if a newspaper was shaken in its face, when it would run open-mouthed all over the deck after the perpetrator of this literary outrage. When a "fall"† was called it would immediately run at a clumsy rate (about one and a half or two miles an hour), first into the surgeon's cabin, then into the captain's (being on a level with the quarterdeck), apparently to see if they were up, and then out again, grunting all about the deck in a most excited manner "*awuk! awuk!*" When the men were "sallying"‡, it would imitate the operation, though clumsily, rarely managing to get more than its own length before it required to turn again. It lay

\* Description des Indes Occidentales, *apud* Buffon.

† When a boat gets "fast" to a Whale, all the rest of the crew run shouting about the decks, as they get the other boats out, "a fall! a fall!" It is apparently derived from the Dutch word "Val," a Whale.

‡ When a ship gets impeded by loose ice gathering around it, the crew rush in a body from side to side so as to loosen it, by swaying the vessel from beam to beam. This is called "sallying the ship."

during the day basking in the sun, lazily tossing its flippers in the air, and appeared perfectly at home and not at all inclined to change its condition. One day the captain tried it in the water for the first time; but it was quite awkward and got under the floe, whence it was unable to extricate itself, until, guided by its piteons "*awuking*," its master went out on the ice and called it by name, when it immediately came out from under the ice and was, to its great joy, safely assisted on board again, apparently heartily sick of its mother element. After surviving for more than three months, it died, just before the vessel left for England. As I was not near at the time, I was unable to make a dissection in order to learn the cause of death.

Regarding the debated subject of the attitude of the Walrus\* I am not in a position to say more than my own notes taken at the time will allow of; I saw none last summer, and I am afraid to trust to a treacherous memory on such a matter. The entries in my diary, however, are explicit enough on the point so far as relates to this young individual; and I presume that its habits are to be taken as a criterion of those of the old one. When asleep in the upturned cask which served it for a kennel, it lay with both fore and hind flippers extended. When *walking* it moved like any other quadruped, but with its *hind flippers heel first*, the *fore flippers* moving in the ordinary way, *toes first*. I am aware that this is in contradiction to the observations of an eminent zoologist; I, however, merely copy what was expressly noted down at the time. It ought also to be mentioned that, in the excellent figures of the Walrus taken by the artist of the Swedish Expedition to Spitzbergen†, under the direction of such well-informed naturalists as Torell, Malmgren, Smitt, Goes, Blomstrand, &c., the fore flippers are represented as rather doubled back, and the hind flippers extended.

*Geographical distribution.*—The Walrus is an animal essentially of the coast, and not of the high seas. Whenever it is found at any distance from land it is almost always on shoals, where it can obtain the Mollusca which form the bulk of its food. The Seal-hunters never see it, nor is it found among the flocks of Seals on the Spitzbergen and Jan Mayen pack-ice. It is found all along the circumpolar shores of Asia, America, and Europe, sometimes extending into the subpolar, and even stragglers find their way into the temperate regions of America, Asia, and Europe. It is not unlikely that it may even be found in the Antarctic regions. On the north-west coast of America I have known it to come as far south as 50° N. lat. The Indians along the shores of Alaska (lately Russian America) carve the teeth into many fanciful ornaments‡; but we should be liable to

\* Gray, Proc. Zool. Soc. 1853, p. 112.

† *Lib. cit.*, facing p. 169 (chromolithograph), and head p. 308, both drawn by Herr von Yhlen.

‡ My friend Mr. A. G. Dallas, late Governor-General of the Hudson's Bay Company's Territories, has a bust of himself beautifully carved out of a Walrus-tooth, by a Tsimpshian Indian at Fort Simpson, B.C.

fall into an error from seeing these teeth among the natives so far south, if we did not know that they are bartered from the more northern tribes. On the American Atlantic seaboard they come as far south as the Gulf of St. Lawrence, and stragglers even further. In Lord Shuldham's day they assembled on the Magdalene Islands in that gulf, to the number of 7000 or 8000; and sometimes as many as 1600 were killed (or rather slaughtered) at one onset by the hunters who pursued them\*. It has been killed several times on the British coast; and I suspect that it is not an unfrequent visitor to our less-frequented shores. Perhaps not a few of the "Sea-horses" and "Sea-cows" which every now and again terrify the fishermen on the shores of the wild western Scottish lochs, and get embalmed among their folklore, may be the Walrus. In addition to those already recorded I know of one which was seen in Orkney, in 1857, and another the Shetland fishermen told me had been seen in the Nor' Isles about the same time. There is, however, some ground for believing that at one time it was, if not a regular member of our fauna, at least a very frequent visitor. Hector Boece (or Boethius, as his name has been Latinized), in his quaint 'Cronikles of Scotland,' mentions it towards the end of the fifteenth century as one of the regular inhabitants of our shores; and old Roman historians describe the horse-gear and arms of the ancient Britons as ornamented with bright polished ivory. It is difficult to suppose that this could have been anything else but the carved tusks of the Walrus. It is not, however, without the bounds of possibility that this might have been some of the African Elephants' ivory which the Phœnician traders bartered for tin with the natives of the Cassiterides. Except for its occasional movements from one portion of its feeding-ground to the other, the Walrus cannot be classed among the migratory animals. In Greenland it is found all the year round, but not south of Rifkol, in lat. 65°. In an inlet called Irsortok it collects in considerable numbers, to the terror of the natives who have to pass that way; and not unfrequently kayakers who have gone "express," have to return again, being afraid of the threatening aspect of "Awuk." A voyager has well remarked that "Awuk" is the lion of the Danish Eskimo; they always speak of him with the most profound respect! It has been found as far north as the Eskimo live, or explorers have gone. On the western shores of Davis's Strait, it is not uncommon about Pond's, Scott's, and Home Bays, and is killed in considerable numbers by the natives. It is not now found in such numbers as it once was; and no reasonable man who sees the slaughter to which it is subject in Spitzbergen and elsewhere can doubt that its days are numbered. It has already become extinct in several places where it was once common. Its utter extinction is a foregone conclusion. Von Baer has studied its distribution in the Arctic sea; and, so far as they go, his memoir and map may be relied on; both, however, require considerable modifications†.

\* *Apud* Pennant, 'Arctic Zoology,' p. 149.

† *Mémoires de l'Académie de St. Pétersbourg*, t. iv. p. 97, t. 4 (1836).

*Economic value and hunting.*—The ivory tusks of the Walrus always command a good price in the market; and the hides are held in high value as an article of commerce; they are used as material for defending the yards and rigging of ships from chafing. It is also occasionally used for strong bands in various machinery, carriage-making, &c. The flesh tastes something like coarse beef. The whalers rarely or ever use it, having a strong prejudice against it in common with that of Seals and Whales. The Walrus-hunters in Spitzbergen almost exist upon it; and the Eskimo high up in Smith's Sound look upon it as their staple article of food. The American explorers who wintered there soon acquired a liking for it. Accordingly the "Morsk" has been hunted in northern regions from a very early period. The Icelandic Sagas (such as the *Speculum regale* &c.) speak of it as *Rostungur*; and there is said to be a letter in the library of the Vatican proving that the old Norse and Icelandic colonists in Greenland paid their "Peter's Pence" in the shape of Walrus-tusks and hides. However, in 890, as far back as the days of King Alfred of England, Æthere, "the old sea-captain who dwelt in Helgoland," gave a most circumstantial account to that monarch (who wrote it down in his *Orosius*) of slaying, he and his six companions, no less than "three score Horse-whales" in one day. At the present period it is principally captured in Spitzbergen by Russian and Norwegian hunters, who visit that island for the purpose. In Danish Greenland, though it was once so abundant that the principle article of trade with Europe, in the days of Erik Raude's colonists, was the tusks of this animal, it may be said now-a-days, so far as its hunting or commercial value is concerned, to be extinct. There are never more than a few killed yearly, and it frequently happens that a year passes without any at all being killed within the limits of the Danish trading-posts. It is more than probable that they never were abundant in South Greenland, but that the old colonists went north in pursuit of them. From the Runic column found on the island of Kingatarsoak in 73° N. lat., we know that these enterprising rovers did sail far north; and it is more than reasonable to suppose that it was on one of these Walrus-hunting expeditions that this monument was erected. Indeed so few are now killed in Danish Greenland (whether through degeneracy of the hunters or scarcity of the Walrus it is scarcely worth inquiring too closely) that as, notwithstanding all the appliances of European civilization now accessible to the natives, ivory cannot be dispensed with in the manufacture of Eskimo implements of the chase, its tusks have sometimes to be reimported from Europe into Greenland. North of the glaciers of Melville Bay, the hardy Arctic highlanders, aided by no *kayak* or rifle, but with a manly self-reliance, enfeebled by no bastard civilization engrafted upon their pristine savagedom, with their harpoon and *allunaks* still boldly attack the Walrus as he lies huddled upon the ice foot; and thereby the native supplies to his family the food and light which make tolerable the darkness of the long Arctic night of Smith's Sound. The whalers kill a few annually, striking them, as they do the Whale, with the gun-harpoon, and killing them with



steel lances\* ; but even then it is dangerous work, and not unfrequently brings the hunter to grief. I have been one of a party who have killed several in this manner, and have also seen them captured by the wild Eskimo at Pond's Bay, on the western shores of Davis's Strait, after the aboriginal fashion ; but as this has been excellently described by Kane† and Hayes‡ in their different narratives, I will not trouble you with any details. The Swedish expedition to Spitzbergen §, and Lord Dufferin|| and Mr. Lamont¶, have given many particulars of its capture by the Spitzbergen hunters. Baron Wrangell\*\* has supplied an account of its chase on different portions of the Siberian coasts ; and Nilsson†† and Keilhau‡‡ complete the list of the principal writers regarding its hunting and commercial importance generally. As I can add nothing of any novelty to their descriptions, you will therefore allow me to refer to them for the particulars which otherwise might have been given under this paragraphic heading.

(7) *CYSTOPHORA CRISTATA* (Erxleb.), Nilss.

*Phoca cristata*, Erxleb.

*Phoca leonina*, O. Fab. (non Linn.).

*Phoca mitrata*, Milbert (Cuv.).

*Phoca leucopla*, Thienem.

*Phoca cucullata*, Bodd.

*Phoca dimidiata*, Cretzsch. (*vide* Rüpp.).

*Phoca isidorei*, Less.

*Mirounga cristata*, Gray.

*Cystophora cristata*, Nilss.

*Cystophora borealis*, Nilss.

*Stenmatopus cristatus*, F. Cuv.

*Stenmatopus mitratus*, Gray.

Popular names.—“*Bladdernose*” or, shortly, “*Bladder*” (of northern sealers, Spitzbergen sea) ; *Klappmysta* (Swedish) ; *Klakkekal*, *Kabbutskobbe* (Northern Norse) ; *Kiknebb* (Finnish) ; *Avjor*, *Fatte-Nuorjo*, and *Oaado* (Lapp) ; *Klapmyds* (Danish ; hence Egede, Grönl. p. 46 : the word *Klapmyssen*, used by him on page 62 of the same work, Engl. trans., and supposed by some commentators to be another name, means only *the* *Klapmyds*, according to the Danish orthography) ; *Klapmütze* (German ; hence Crantz, Grönl. i. p. 125 : I have also occasionally heard the English sealers call it by this

\* The ordinary rifle is of comparatively little use in hunting this monster Seal. Musket-balls will scarcely affect their pachydermatous side ; and I have often seen leaden balls flattened on their skulls ! I have more than once seen it snap a steel lance in two with its powerful molars.

† Arctic Explorations.

‡ ‘The Open Polar Sea,’ and ‘An Arctic Boat-voyage.’

§ Svenska Expeditionen til Spetsbergen år 1861, &c., pp. 168-182.

|| Letters from High Latitudes.

¶ Seasons with the Sea-horses.

\*\* Nordküste von Sibirien, ii. pp. 319, 320.

†† *Lib. cit.* i. pp. 320-325.

‡‡ Rcise i Ost- og Vest-Finmarken &c. pp. 146-149.

name, apparently learnt from the Dutch and German sailors). All of these words mean the "Seal with a cap on," and are derived from the Dutch, who style the frontal appendage of this species a *nutz* or cap, hence the Scotch *nutch*. This prominent characteristic of the Seal is also commemorated in various popular names certain writers have applied to it, such as *Blas-Skül* (Bladder-Seal) by Nilsson (Skand. Faun. i. p. 312), *Hooded Seal* by Pennant (Synopsis, p. 342), *Seal with a caul* by Ellis (Hudson Bay, p. 134), in the French vernacular *Phoque à capuchon*, and in the sealers' name of *Bladdernose*, *Neitersoak* (Greenland), and *Kakortak* (when two years old).

*Descriptive remarks.*—This is one of the largest Seals in Greenland, and in its adult state is at once distinguished by the curious bladder-like appendage to its forehead, which is connected with the nostrils and can be blown up at will\*. This has been well described by Dr. DeKay in the 'Annals of the Lyceum of Natural History of New York,' vol. i.; and with his observations I perfectly agree. The eye of this Seal is large, and of a glassy black colour with a dark-brown iris. It has, like all the family, no external auricle; and the orifice of the ear is very small. The body is long and robust; its colour on the upper or dorsal aspect is dark chesnut or black, with a greater or less number of round or oval markings of a still deeper hue. The hair is long and somewhat erect, and the thick fur-like coating next the skin is often tinged with a reddish coppery colour. The head and flippers are of the same dark chesnut-colour. The pectoral and ventral regions are of the same dark-grey or tarnished-silvery hue which has been described in the *P. groenlandicus*.

*Habits &c.*—The Bladdernose is not only one of the largest, but the fiercest of the northern Seals; and as its capture requires some skill, it is only the most expert *kayaker* that can procure any. It will chase a man and bite him, besides making a great commotion in the water. Therefore the hunt is very dangerous to a man in such a frail craft as the Greenland *kayak*. Like all Seals, during the rutting-time, there are great battles on the ice between the males; and the roaring is said to be sometimes so loud that it can be heard four miles off. The skin is often full of scratches from these fights; but as long as the memory of the oldest inhabitant of South Greenland extends, only one man in the district of Julianshaab (where they are chiefly captured) has been killed by the bite of the Klapmyds, though not unfrequently the harpoon and line have been broken. The hunting is not so dangerous, however, within late years, as it has been effected by the rifle from the ice; but when the Seal has not been killed outright, the hunter goes out in his kayak and despatches it with the lance.

With regard to the favourite localities of this species of Seal, Crantz and the much more accurate Fabricius disagree—the former affirming that they are found mostly on great ice islands where they

\* It is often asserted by the sealers that this "bladder" is a sexual mark, and is not found on the female. I do not think there is any just ground for this belief.

sleep in an unguarded manner, while the latter states that they delight in the high seas, visiting the land in April, May, and June. This appears contradictory and confusing; but in reality both authors are right, though not in an exclusive sense. The hood appears to be an organ of defence from any stunning blow on the nose, the most vulnerable place in a Seal. It only inflates this "bladder" when irritated. The sealers look upon it as a reservoir of air when under the water\*. The story which Fabricius relates about its "shedding tears abundantly" when surprised by the hunter is, I suspect, only an Eskimo tale of wonder. I could find no one credulous enough to believe it; nor during the whole time I passed among the seal-hunters of the far north did I find that any one esteemed my credulity great enough to venture any such story on me.

It is affirmed, curiously enough, that the *Bladdernose* and the *Saddleback* are rarely or ever found together; they are said to disagree. At all events, the latter is generally found on the inside of the pack, while the former is on the outside. The latter is also much more common than the *Bladdernose*.

*Procreation and young.*—At first the young *Bladdernose* is pure white: during the first year, as it grows older and increases in size, a grey tinge appears; and gradually it assumes a deeper and deeper hue of the same colour. I cannot confirm the remarks of Otho Fabricius, that during the second year (when they are called *Kakortak*) they are snow-white, with a straight line of brown on their backs. Neither I nor any other Seal-hunter with whom I have talked ever saw such a Seal in the Greenland sea; and it appears to be equally unknown in Greenland. Mr. Tegner, who passed several years in a South-Greenland settlement, subsisting almost entirely by the catching of this Seal, informs me that he never heard of such an animal. It is therefore just possible that Fabricius may have been mistaken, though the characteristic marks mentioned are so prominent that it is hardly probable that he could have been in error. In fact, the majority of the "Bladdernoses" which I have seen were about two or three years old, and appeared, by a slow and gradual change, becoming similar to the old and mature Seals, by turning darker and darker in their colours, and assuming the roundish oval markings, while at the same time they were increasing in size. This species seems to produce its young earlier than *P. grœnlandicus*.

*Geographical distribution and migrations.*—The *Bladdernose* is found all over the Greenland seas, from Iceland to Greenland and Spitzbergen, but chiefly in the more southern parts. The first Seals which we saw and killed on the making of the ice early in March 1861, were chiefly young "bladders" which had not yet got the hood-like appendage. It even finds its way to the temperate shores

\* Mr. J. Walker, Master of the screw-steamer 'Wildfire,' and one of the most intelligent of the whaling captains, assured me (June 1861), from his own observation, that this Seal lies frequently on the top of elevated pieces of ice, and that the use of this hood, or "bladder," appears to be to raise it up with sufficient momentum to the surface (by filling it with air) so as to spring again on to the ice.

of Europe and America ; and rare stragglers now and then land on the shores of Britain, though it is by no means a member of our fauna proper. This Seal is not common anywhere. On the shores of Greenland it is chiefly found beside large fields of ice, and comes to the coast, as was remarked by Fabricius long ago, at certain times of the year. They are chiefly found in South Greenland, though it is erroneous to say that they are exclusively confined to that section. I have seen them not uncommonly about Disco Bay, and have killed them in Melville Bay, in the most northerly portion of Baffin's Bay. They are principally killed in the district of Julianshaab, and then almost solely in the most southern part, on the outermost islands from about the 20th of May to the last of June ; but in this short time they supply a great portion of the food of the natives, and form a third of the colony's yearly production. In the beginning of July the Klapmyds leaves, but returns in August, when it is much emaciated. Then begins what the Danes in Greenland call the "*magre klapmydsefangst*," or the lean-Klapmyds catching, which lasts from three to four weeks. Very seldom is a Klapmyds to be got at other places, and especially at other times. The natives call a Klapmyds found single up a fjord by the name of "Neriniartout," the meaning of which is "gone after food." They regularly frequent some small islands not far from Julianshaab, where a good number are caught. After this, they go further north, but are lost sight of, and it is not known where they go to (Rink, *l. c.*). Those seen in North Greenland are mere stragglers wandering from the herd, and are not a continuation of the migrating flocks. Johannes (a very knowing man of Jakobshavn) informed me that generally about the 12th of July a few are killed in Jakobs-havn Bay (lat. 69° 13' N.).

*Economic value and hunt.*—The Klapmyds yields, on the average, half a cask of blubber, and the dried meat of every Seal weighs about 24 Danish lbs. ; but this is not the whole Seal, which weighs about 200 lbs. The yearly catch in Greenland (Danish) is about 2000 or 3000\*.

##### 5. *Commercial Importance of the "Seal Fisheries."*

The Greenland (*i. e.* Spitzbergen) sealing fleet from the British ports meet about the end of February in Bressa Sound, off Lerwick, in Zetland ; it leaves for the north about the first week in March, and generally arrives at the ice in the early part of that month. The vessels then begin to make observations for the purpose of finding the locus of the Seals ; and this they do by crawling along the edge of the ice, and occasionally penetrating as far as possible between 70° and 73° N. lat., then continue sailing about until they find them, which they generally do about the first week of April. If they do not get access to them, they remain until early in May, when, if they intend to pursue the whaling in the Spitzbergen sea that summer, they go north to about 74° N. lat. to the "old sealing," or, further still (even to 81° N.), to the whaling. Most of them, however, if not successful

\* Rink, *l. c.*

by the middle of April, leave for home, to complete their supplies in order to be off by the 1st of May to the Davis's Straits whale-fishery. During the months of March and the early part of April the sealers are subject to all vicissitudes of weather, calm and storm suddenly alternating, while the thermometer will stand for weeks at zero, or even many degrees below it.

The number of Seals taken yearly by the British and continental ships (principally Norse, Dutch, and German) in the Greenland sea when they get among them will average upwards of 200,000, the great bulk of which are young "saddlebacks," or, in the language of the sealer, "whitecoats." When they have arrived at their maximum quality, 80 generally yield a tun of oil; otherwise the general average is about 100 to the tun. In 1859 good oil sold for about £33 per tun; add to this the value of 100 skins at 5s. each, and the whole will amount to £58 sterling. From this simple calculation a very good estimate may be formed of the annual commercial value of the Greenland "Seal Fishery;" for, supposing 2000 tuns of oil to be about the annual produce, and assuming £58 as the value per tun inclusive of the skins, the whole produce of the fishery will amount to the yearly value of £116,000 sterling (*Wallace*). This, of course, does not take into calculation the produce the Danish Government derives from their colonies on the west coast of Greenland (which I notice under the head of each Seal), nor what the Russians derive from the coast of Spitzbergen and from the White Sea. The "fishery," however, is very precarious. Some years little or nothing is got, the ice being too thick for the ships to "get in to them." In one year it may happen that the fishery in the Spitzbergen Sea proves a failure while the Newfoundland one is successful. For some years past it has proved in the former sea almost a failure\*. There seems, indeed, little doubt that the fishery must fail in course of time, as have the Seal- and Whale-fisheries in some other parts of the world; and if Seal-hunting is pursued with the energy it is at present, that day cannot be far distant. Some of the sealers laugh at this idea; but where is the enormous produce the South Seas used to yield, superior to anything ever heard of in the north. No doubt the South-Sea hunters said the same thing; and doubtless when the inhabitants of Smeerenberg, that strangest of all strange villages, saw the Whales sporting in thousands in their bays, and the oil-boilers steaming above the peaks of Spitzbergen, they laughed at the idea of their ever becoming scarce! Yet how false that idea has proved! for in our day the waters of those high northern seas are rarely troubled, even by a wandering Mysticete that perchance may have missed its way in making a passage from one secure retreat to another. So will it ultimately be with the Seals. Indeed some are even now of opinion that they are diminishing in numbers; at least they have evidently reached their zenith, as shown by statistics; and taking into

\* It has been rather more successful in Newfoundland. This year (1868) up to the 28th of April 250,000 Seals had arrived at St. John and Harbour Grace. *Vide* a good account of the sealing by the continental vessels in Petermann's 'Geogr. Mittheil.' Feb. 1868.

consideration the appearance the young Seals presented on the ice in 1861, they did not approach the numbers reported to have been seen by sealers in many previous years. The South-Sea "fisheries" became extinct in fifteen years, and, making all allowance for the protection afforded to the Greenland Seals by the ice, and supposing the sealing prosecuted with the same vigour as at present, I have little hesitation in stating my opinion that, before thirty years shall have passed away, the "Seal-fishery," as a source of commercial revenue, will have come to a close, and the progeny of the immense number of Seals now swimming about in the Greenland waters will number but comparatively few. This event will then form another era in the northern fisheries.

### 3. Note on the Alleged Occurrence of the Rhinoceros in Borneo. By ANDREW MURRAY, F.L.S.

It is only lately that I have seen Dr. Gray's paper on the Rhinocerotidæ, published in the third part of the 'Proceedings' of this Society for 1867; and I should wish to be allowed to enter my caveat against the reception of one statement in it which is, I think, likely to mislead, namely, that the Rhinoceros is a native of Borneo.

Some time since I was informed by a friend that the theory by which I had attempted to account for the remarkable absence of all large Mammals, and the great scarcity of all but arboreal, aquatic, or aerial animals, in Borneo, was knocked on the head, for the Rhinoceros had now been actually found in it, and that all doubt as to the locality was set at rest by specimens having been sent to this country which, on examination, were found to belong to a new and distinct species. They not only had specimens of it, but, as Prince Hal said, "we can show it you here in the house"—the British Museum, to wit.

Of course in the face of such a stunning fact I had nothing for it but to eat my leek in silence, abandon my position, and endeavour to rally my disbanded and scattered ideas to the best of my ability.

The perusal of Dr. Gray's paper, however, not only reveals the source of my friend's information, but satisfies me that I have been too hasty in accepting it as correct.

Literally my friend's statement is quite borne out by Dr. Gray's paper. Dr. Gray says everything that he said; but I look in vain for any proof in support of it; and as any statement coming from a man of Dr. Gray's authority is likely to be accepted as *probatio probata*, I think it the more necessary to point out the insufficiency of the grounds on which his statement rests.

In the first place I observe that the sole evidence offered is that of a skull which "was purchased of a dealer, who said that he received it direct from Borneo." It does not follow, supposing the statement

to be quite true, that therefore the skull was that of an animal which *lived* in Borneo. A collector in the Malayan archipelago moving about from place to place, or a resident receiving curiosities from all sources, would have many things in his stores collected at various places; but it would never follow that they were all to be held to have been collected at the port from which they happened to be shipped home. It would be going a long way back to the infancy of collecting if we are to take the port of shipment as proof of the locality, and most of all in that archipelago, where different islands with different products lie so near to each other.

Next, before we can trust even the statement that it *had* been received direct from Borneo, we should require to know the name and reputation of the dealer. There are dealers who know the importance of accuracy in localities, and there are dealers who do not. There are dealers (such as Mr. Stevens) on whose word the utmost reliance can be placed, and there are others on whom none can be placed. Of the latter there are some whose word cannot be trusted without confirmation, simply because they are habitually careless; others are intentionally dishonest; and, so far as dealers are concerned, everything in this inquiry will depend on the character of the individual. We shall have plenty of Rhinoceroses offered from Borneo as soon as it is known that the locality will give them value. Dr. Gray should therefore have given the name of the dealer as a slight additional help to the expiscation of the truth; and others might then have been able to sift the statement, and trace the origin and history of the particular skull in question.

But, according to Dr. Gray, the skull has been found to belong to a different species from the Javan one. This is putting the case much too broadly. Dr. Gray says that it does; that is all; no one else does.

Not having seen the skull, and even if I had, not being competent to form a judgment on its osteological characters, I offer no opinion of my own on the value of Dr. Gray's species so far as based on them. But I have asked the opinion of one whose competence to pronounce on such questions none can dispute, viz. Professor Owen; and he informs me that "in his opinion the osteological characters on which Dr. Gray founds his *Tapirus laurillardii*, *Rhinoceros nasalis*, &c. are of no specific value; and in that opinion every European zoologist is at one." I may add that although I do not pretend to be qualified to give an opinion on the osteological characters, there is another point on which I consider that I am competent to form an opinion; and that is, the support the supposed species receives from difference of locality. Now the argument that the Rhinoceros is a native of Borneo because the skull "received direct from Borneo" belongs to a different species from the Javan Rhinoceros can only have weight if the Bornean type is confined to Borneo. But it would appear that this is not the case. There is another skull in the British Museum which Dr. Gray refers to this new species, but it is marked as from Java. Dr. Gray, however, thinks this is an error, and that it must have come from Borneo,

because it belongs to his supposed Bornean species. He says "It was purchased from a dealer and has been marked '*R. sondaicus*, Cuv., Java,' by some previous possessor. The habitat may depend on the person having decided it to be *R. sondaicus*." "He that is giddy thinks the world turns round." In the same spirit the person who has now decided it to be *R. nasalis* has given it the habitat of Borneo, that being boldly and unqualifiedly given as the habitat of the species in the diagnosis. This is no doubt ingenious, but it is not logical.

Were we to act on this principle, natural history must be removed altogether from the category of sciences of fact, and removed into those of conjecture and imagination.

In estimating the import of the foregoing facts I would only add that, seeing that the conclusions to which I demur rest so absolutely and entirely on the opinion and inquiries of one individual, the bent and tone of that individual's mind must form fair elements to be taken into account in arriving at a decision. If, for example, the individual belonged to that section of naturalists who are more disposed to diminish than increase the number of species, then his opinion in favour of an additional species would of course have more weight. But if, as I imagine my excellent friend Dr. Gray will not dispute, his mind rather belongs to that class whose discrimination of differences is keener than their perception of resemblances, then greater caution ought to be exercised in accepting his conclusions.

So dealing with the present question, I think it rests exactly as it did before Dr. Gray touched it. The Rhinoceros *may* be a native of Borneo; but as yet we have not the slightest evidence of it; while the fact of its presence never having been authenticated, although well-known to be disputed, is in itself a strong presumption to the contrary.

4. Synopsis of the American Rails (*Rallidæ*). By P. L. SCLATER, M.A., Ph.D., F.R.S., and OSBERT SALVIN, M.A., F.L.S., &c.

(Plate XXXV.)

The *Rallidæ*, when restricted to the genera *Rallus*, *Crex*, *Gallinula*, *Fulica*, and their immediate allies, constitute a very natural family of birds allied to the Cranes (*Gruidæ*) and to their somewhat abnormal relatives the genera *Eurypyga*, *Psophia*, and *Aramus*, and form part of Prof. Huxley's group *Geranomorphæ*\*. To these, however, we must add the genus *Heliornis*, which, according to the best authorities, both on anatomical and pterylographical grounds belongs here.

The American *Rallidæ*, which are alone considered in this com-

\* See P. Z. S. 1867, p. 457.





M. & N. Hanhart, imp.

PORZANA LEVRAUDI.

J. Smit, lith.



munication, may be very naturally divided into three subfamilies, as follows:—

- a. digiti omnino sejuncti: tarsus elongatus: caudæ rectrices parvæ breves, laxæ, X aut XII.
  - a'. frons plumosus: pedes gressorii: tarsus plus minusve rotundatus: digiti non-membranati ..... I. RALLINÆ.
  - b'. frons scutatus: pedes natatorii: tarsus plus minusve compressus: digiti plerumque aut membranati aut lobati ..... II. FULICINÆ.
- b. digiti ad basin juncti: tarsus brevis: caudæ rectrices magnæ elongatæ, rigidæ, XVIII. .... III. HELIORNITHINÆ.

These three subfamilies, as far as we have become acquainted with them, contain 48 American species, belonging to 10 genera, namely:—

<i>Rallinæ</i> .....	5 genera: 35 species.
<i>Fulicinæ</i> .....	4 genera: 12 species.
<i>Heliornithinæ</i> .....	1 genus: 1 species.

There remain, however, two described species unknown to us, viz. *Rallus maculosus* (Vieill. N. D. xviii. p. 556, et Enc. Méth. p. 1066) and *Crex facialis* (Tsch. F. P. p. 301).

Subfam. I. RALLINÆ.

*Conspectus generum Rallinarum.*

- a. nares apertæ, perviæ.
  - a'. nares lineares, angustæ ..... 1. *Rallus*.
  - b'. nares dilatatæ, oblongo-lineares.
    - a''. rostrum longius quam caput ..... 2. *Aramides*.
    - b''. rostrum brevius quam caput.
      - a'''. tarsus digito medio longior ..... 3. *Porzana*.
      - b'''. tarsus digito medio brevior ..... 4. *Crex*.
- b. nares antice membrana obtectæ, imperviæ ..... 5. *Thyrorhina*.

Genus I. RALLUS.

	Type.
<i>Rallus</i> , Linn. S. N. i. p. 261 (1766).....	<i>R. aquaticus</i> .
<i>Pardirallus</i> , Bp. C. R. xliii. p. 599 (1856) ....	<i>R. maculatus</i> .
<i>Limnopardalis</i> , Cab. J. f. O. 1856, p. 428.....	<i>R. maculatus</i> .

*Clavis specierum.*

- a. albo variegatus ..... 1. *maculatus*.
- b. non albo variegati.
  - a'. rostro incurvo.
    - a''. dorso variegato.
      - a'''. majores { dorsi flammulis nigris ..... 2. *elegans*.
      - { dorsi flammulis fuscis ..... 3. *longirostris*.
      - b'''. minores.
        - a'''. subtus rufescens ..... 4. *virginianus*.
        - b'''. subtus plumbei { minor: lateribus distincte albo vittatis ..... 5. *antarcticus*.
        - { major: lateribus obsolete vittatis ..... 6. *semitlumbus*.
    - b''. dorso unicolori ..... 7. *rythirhynchus*.
  - b'. rostro recto ..... 8. *nigricans*.

## 1. RALLUS MACULATUS.

*Rallus maculatus*, Bodd. ex Buff. Pl. Enl. 775; Schlegel, Mus. d. P.-B. Ralli, p. 13.

*Rallus variegatus*, Gm. S. N. i. p. 718; Burm. Syst. Ueb. iii. p. 382.

*Ypacaha jaspeado todo*, Azara, Apunt. iii. p. 217.

*Pardirallus variegatus*, Bp. C. R. xliii. p. 599.

*Limnopardalis variegatus*, Cab. Journ. f. Orn. 1856, p. 428; Gundl. Rep. Fis. Nat. i. p. 361.

*Aramides maculatus*, Hartl. Ind. Az. p. 23; Gray, Gen. B. p. 594.

*Niger, dorso et alis oleagineis: omnino albo maculatus: subtus albo et nigro transfasciatus: gula et crisso albis: rostro flavo, macula ad basin sanguinea: long. tota 11, alæ 5·2, caudæ 2, rostri a rictu 1·9, tarsi 1·7 poll. Angl.*

*Hab.* Cayenne (*Buff.*); South-eastern Brazil (*Burm.*); Paraguay (*Azara*); Cuba (*Gundl.*); Para (*Mus. Derb.*); New Granada (*Mus. Brit.*).

*Mus. Brit., Derb.*

## 2. RALLUS ELEGANS.

*Rallus elegans*, Aud. Orn. Biogr. iii. p. 27, t. 203; Cassin in Baird's Birds N. Am. p. 748; Gundl. Journ. f. Orn. 1856, p. 427, et Rep. Fis. Nat. i. p. 360.

*Rallus longirostris*, Scl. P. Z. S. 1864, p. 179 (err.).

*Supra grisescenti-fuscus: dorso nigricante flammulato: subtus pallide rufescens, gula albicante: hypochondriis et tectricibus subalaribus fuscis albo transfasciatis: long. tota 15·5, alæ 6·5, caudæ 2·5, tarsi 2·2, rostri a rictu 2·7.*

*Hab.* Southern States of Eastern America and California (*Baird*); Mexico (*White*); Cuba (*Gundlach*).

*Mus. Brit., S. & G.*

## 3. RALLUS LONGIROSTRIS.

*Rallus longirostris*, Bodd. (ex Buff. Pl. Enl. 849); Burm. Syst. Ueb. iii. p. 381; Newton, Ibis, 1859, p. 260; Gosse, B. Jamaica, p. 364; Léotaud, Ois. Trinidad, p. 491.

*Rallus crepitans*, Gm. S. N. i. p. 713; Cab. in Schomb. Guian. iii. p. 760; Cassin in Baird's B. N. Am. p. 747; Gundl. Journ. f. Orn. 1856, p. 427, et Rep. Fis. Nat. i. p. 361; Sclater, P. Z. S. 1861, p. 81.

*Supra olivaceo-fuscus, dorsi plumis cineraceo marginatis: subtus pallide fulvus, gula albicante, hypochondriis et tectricibus subalaribus fuscis albo transfasciatis: long. tota 14·0, alæ 6·0, caudæ 2·5, tarsi, 2·1, rostri a rictu 2·9.*

*Hab.* Sea-coast of Southern Atlantic States (*Baird*); Cuba (*Gundlach*); Jamaica (*Gosse*); S. Croix (*Newton*); Trinidad (*Léotaud*); Guiana (*Schomb.*); Cayenne (*Buff.*); Brazil, Bahia (*Burm.*).

*Mus. Brit., S. & G.*

*Obs.* Similis præcedenti, sed statura paulo minore, dorsi flammulis pallidioribus et pectore dilutiore, pallide fulvo nec rufescente, distinguendus.

#### 4. RALLUS VIRGINIANUS.

*Rallus virginianus*, Linn. S. N. p. 263; Cassin in Baird's Birds N. Am. p. 748; Cab. J. f. O. 1856, p. 427; Gundl. Rep. F. N. i. p. 361; Sel. & Salv. Ibis, 1860, p. 277; Schlegel, Mus. d. P.-B. Ralli, p. 11.

*Rallus limicola*, Vieill. Enc. Méth. p. 1059.

*Supra brunneus nigro flammulatus: alis extus rufis: subtus pallide rufescenti-fulvus: hypochondriis et tectricibus subalaribus nigris albo transfasciatis: long. tota 9·3, alæ 4·1, caudæ 1·7, tarsi 1·7, rostri a rictu 1·7.*

*Hab.* America borealis univ. (*Baird*); Mexico; Guatemala (*Salvin*).

*Mus. Brit., S. & G.*

#### 5. RALLUS ANTARCTICUS.

*Rallus antarcticus*, King, Zool. Journ. iv. p. 95.

*Rallus rufopennis*, Gray, in Mus. Brit. et List of Birds in B. M. iii. p. 116 (*descr. nulla*).

*Rallus uliginosus*, Phil. Wieg. Arch. 1858, p. 83.

*Supra brunneus nigro flammulatus, tectricibus alarum rufis: alarum remigibus nigricantibus, unicoloribus: subtus plumbeus: hypochondriis et subalaribus nigris albo transfasciatis: long. tota 8·0, alæ 3·7, caudæ 1·5, rostri a rictu 1·3, tarsi 1·2.*

*Hab.* Chili (*Philippi*).

*Mus. Brit., S. & G.*

*Obs.* Minor quam sequens, et lateribus albo vittatis et gula media albicante satis diversus.

#### 6. RALLUS SEMIPLUMBEUS.

*Rallus semiplumbeus*, Sclater, P. Z. S. 1856, p. 31; Schlegel, Mus. d. P.-B. Ralli, p. 11.

*Supra brunnescenti-olivaceus, nigro flammulatus: alis caudaque nigricanti-brunneis: alarum tectricibus rufis: capitis lateribus et corpore toto subtus plumbeis: tectricibus subcaudalibus albis nigro mixtis: hypochondriis albo subobsolete transfasciatis: rostri culmine et apice nigris, mandibula autem inferiore ruberrima: pedibus pallide brunneis: long. tota 8·5, alæ 4·4, caudæ 1·8, rostri 1·7.*

*Hab.* Nova Granada.

*Mus. Brit. (ex. typ.).*

*Sim. R. virginiano*, sed major, subtus omnino plumbeus et gutture albicante.

## 7. RALLUS RYTHIRHYNCHUS, Vieill.

*Ipacaha pardo*, Azara, Apunt. iii. p. 220. no. 372.

*Rallus rythirhynchus*, Vieill. N. D. xiii. p. 521, et E. M. p. 1060; ScL. & Salv. P. Z. S. 1867, p. 990, et 1868, p. 145.

*Aramides rythirhynchus*, Burm. La Plata-Reise, ii. p. 504.

*Rallus setosus*, King, Zool. Journ. iv. p. 94.

*Rallus cæsius*, Tsch. F. P. *Aves*, pp. 52, 301; Schlegel, Mus. d. P.-B. *Ralli*, p. 8; Cassin, Gilliss's Exp. ii. p. 194.

*Rallus sanguinolentus*, Sw. An. in Men. p. 335; Bridges, P. Z. S. 1843, p. 118; Darwin, Zool. Voy. Beagle, iii. p. 133; Sclater, P. Z. S. 1867, p. 333.

*Rallus bicolor*, Gay, Faun. Chil. *Aves*, p. 434.

*Aramides zelebori*, Pelzeln, Novara-Reise, Vög. p. 133 (?).

*Supra oleagineo-brunneus*: *subtus plumbeus*: *rostro viridi*, *macula mandibulæ basali sanguinea*: *long. tota* 12·0, *alæ* 5·4, *caudæ* 2·8, *rostri a rictu* 2·1, *tarsi* 1·8 (*specim. ex Chili*).

*Hab.* Paraguay (*Azara*); rep. Argentina (*Burm.*); Chili (*Leybold*); West Peru (*Whitely*); South Brazil (*Zelebor*).

*Mus.* Brit., S. & G.

Concerning the variations of this species, see our remarks, P. Z. S. 1867, p. 990, and 1868, p. 145. In the British Museum is a skin from Hermite Island, Tierra del Fuego, which, though generally resembling the present bird, is of much larger dimensions, and will in all probability require specific separation.

## 8. RALLUS NIGRICANS.

*Ipecaha obscuro*, Azara, Apunt. iii. p. 219. no. 371.

*Rallus nigricans*, Vieill. N. D. xxviii. p. 560, et Enc. Méth. p. 1067; Max. Beitr. iv. p. 782; Schlegel, Mus. d. P.-B. *Ralli*, p. 8.

*Aramides nigricans*, Hartl. Ind. Az. p. 23; Burm. Syst. Ueb. iii. p. 385, et La Plata-Reise, ii. p. 504.

*Rallus bicolor*, Cuv. in Mus. Paris.; Blackwall, Brewster's Journ. vi. p. 77 (1832).

*Gallinula cæsia*, Spix, Av. Bras. ii. p. 73, t. 95.

*Rallus cæsius*, Sw. An. in Men. p. 335.

*Rallus immaculatus*, Licht. Doubl. p. 79.

*Supra oleagineo-brunneus*: *fronte, capitis lateribus et corpore subtus plumbeis*; *gula albicante*: *ventre imo, tibiis et cauda nigricantibus*: *rostro recto, unicolori, obscure viridi*: *long. tota* 10·0, *alæ* 4·8, *caudæ* 2·3, *rostri a rictu* 1·9, *tarsi* 1·7.

*Hab.* Brasil. merid. orient.; Minas Geraes (*Spix*); S. Paolo et Bahia (*Licht.*); Paraguay (*Azara*).

*Mus.* Brit., S. & G.

## Genus 2. ARAMIDES.

Type.

*Aramides*, Puch. R. Z. 1845, p. 277. . . . . *A. cayennensis*.

*Ortygarchus*, Cab. in Schomb. Guian. iii. p. 759 *A. cayennensis*.

*Clavis specierum.*

- a. subalaribus rufis nigro transfasciatis.
- |                                  |   |
|----------------------------------|---|
| a'. pectore griseo, ventre rufo. |   |
| a''. tibiis nigricantibus        | { minor: ventre castaneo-rufo<br>unicolori ..... 1. <i>cayennensis</i> .              |
|                                  | { major: ventre dilutiore rufo<br>et medialiter albicante ... 2. <i>albiventris</i> . |
| b''. tibiis griseis              | 3. <i>ypecaha</i> .   |
| b'. pectore et ventre rufis      | 4. <i>ruficollis</i> .  |
| c'. pectore et ventre plumbeis   | 5. <i>saracura</i> .  |
- b. subalaribus nigris albo transfasciatis.
- |   |                       |
|---|-----------------------|
| capite et cervice undique cum pectore rufis | 6. <i>axillaris</i> . |
| capite et cervice griseis                   | 7. <i>mangle</i> .    |

## 1. ARAMIDES CAYENNENSIS.

*Poule d'eau de Cayenne*, Buff. Pl. Enl. 352.

*Fulica cayennensis*, Gm. S. N. i. p. 700.

*Gallinula cayannensis*, Lath. Ind. Orn. ii. p. 767; Max. Beitr. iv. p. 798.

*Ortygarchus cayannensis*, Cab. in Schomb. Guian. iii. 759.

*Aramides cayennensis*, Gray, Gen. of B. iii. p. 594; Burm. Syst. Ueb. iii. p. 385.

*Gallinula ruficeps*, Spix, Av. Bras. ii. p. 74, t. 96.

*Gallinula ruficollis*, var., Sw. Zool. Ill. iii. t. 173.

*Chiricote*, Azara, Apunt. iii. p. 214. no. 368.

*Rallus chiricote*, Vieill. N. D. xxviii. p. 558, et Enc. Méth. p. 1060. 1/

*Aramides chiricote*, Hartl. Ind. Az. p. 23.

*Aramides chiricote*, Léotaud, B. Trinidad, p. 196.

*Rallus maximus*, Vieill. Enc. Méth. p. 1058.

*Aramides maximus*, Schlegel, Mus. d. P.-B. *Ralli*, p. 14.

*Aramides ruficollis*, Lawr. Ann. L. N. Y. vii. p. 479 (?).

*Supra olivaceus, collo cinereo, pileo fusco-rufescente, uropygio nigro, remigibus castaneis: subtus castaneus, gula alba, cervice cinerea: ventre imo cum crisso et cauda nigris: tibiis nigricantibus: subalaribus rufis nigro transfasciatis: long. totu 13.0, alæ 6.8, caudæ 2.6, tarsi 2.8, rostri a rictu 2.2.*

*Hab.* Panama (*McCleannan*); New Granada, Bogota (*Mus. S. & G.*); Trinidad (*Léotaud*); British Guiana (*Schomb.*); Cayenne (*Buffon*); South-east Brazil (*Max.*, *Spix*, et *Burm.*); prov. S. Paolo (*Natt.*); Paraguay (*Azara*).

*Mus. Brit., S. & G.*

We have compared skins of this wide-ranging species from Panama, New Granada, the vicinity of Bahia, and the province of S. Paolo, Brazil.

## 2. ARAMIDES ALBIVENTRIS.

*Aramides albiventris*, Lawr. Pr. Ac. Phil. 1867, p. 234.

*Aramides cayennensis*, Moore, P. Z. S. 1859, p. 64; Scl. & Salv. Ibis, 1859, p. 230; Scl. P. Z. S. 1859, p. 393, 1857, p. 206, 1856,

p. 143; Salv. P. Z. S. 1867, p. 161 (?); Scl. & Salv. P. Z. S. 1867, p. 280 (?).

*Aramides ypacaha*, Schlegel, Mus. de P.-B. *Ralli*, p. 14 (?).

*Similis præcedenti, sed major, cervice cinerea latiore, abdomine fulva-rufo, ad marginem ventris nigri albicante, et pedibus fortioribus distinguendus: long. tota 14.0, alæ 7.8, caudæ 2.6, tarsi 3.3, rostri a rictu 2.7.*

*Hab.* Southern Mexico (*Sallé*); Oaxaca (*Boucard*); Honduras, Omoa (*Leyland*); Guatemala, Vera Paz and Pacific coast (*Salvin*).

*Mus.* S. & G.

We cannot now tell whether the specimens from David and Mosquitia ought to be referred to this northern form, or to its southern representative *A. cayennensis*, which certainly occurs as far north as Panama.

We are likewise uncertain what Prof. Schlegel's *A. ypacaha* from the "Isle de St. Thomas" may be, unless it is referable to the present bird. The true "*Ypacaha*" of Azara is undoubtedly the same species as that which Schlegel refers to as *A. gigas*.

### 3. ARAMIDES YPACAHA.

*Ypacaha*, Azara, Apunt. iii. p. 210. no. 367.

*Rallus ypacaha*, Vieill. N. D. xxviii. p. 568, et Enc. Méth. p. 1071.

*Aramides ypacaha*, Hartl. Ind. Az. p. 23; Gray, Gen. B. iii. p. 594; Scl. & Salv. P. Z. S. 1868, p. 144.

*Gallinula gigas*, Spix, Av. Bras. ii. p. 75, t. 99.

*Aramides gigas*, Burm. Syst. Ueb. iii. p. 383; La Plata-Reise, ii. p. 504; Gray, Gen. B. iii. p. 594; Schlegel, Mus. de P.-B. *Ralli*, p. 14.

*Crex melampyga*, Licht. Doubl. p. 79.

*Supra olivacea, colla rufo, frante cinerascens: uropygio et cauda nigris: subtus gula alba, pectore et cervice toto cinereis: abdomine rasaceo-rubro, ventre imo cum tibiis griseis: hypochondriis et crisso nigris: subalaribus rufis nigro transfasciatis: long. tota 19.0, alæ 8.5, caudæ 3.3, tarsi 3.5, rostri a rictu 2.9.*

*Hab.* Paraguay (*Azara*); Brasil., Minas Geraes (*Burm.*); rep. Argentina, Parana (*Burm.*); Buenos Ayres (*Hudson*).

*Mus.* Brit., Smiths.

### 4. ARAMIDES RUFICOLLIS.

*Black-bellied Gallinule*, Lath. Syn. v. p. 253.

*Fulica ruficollis*, Gm. S. N. i. p. 700.

*Aramides ruficollis*, Schlegel, Mus. de P.-B. *Ralli*, p. 15.

*Supra brunnescenti-olivaceus, pileo rufescente tincto: gula alba, cervice angusta cinerea: pectore toto cum ventre castanea-rufis: ventre imo et crisso nigris.*

*Hab.* Cayenne (*Latham*); Lima (*Mus. Brit.*).

*Mus.* Brit.

*Obs.* Similis *A. cayennensi*, sed pectore rufo ventre concolori, et corpore supra brunnescentiore olivaceo.



A single indifferent skin in the British Museum, marked "Lima," is the only specimen we have met with which seems to correspond with Latham's description of this bird; but we are not sure whether it is really distinct from *A. cayennensis*.

#### 5. ARAMIDES SARACURA.

*Chiricote aplomado*, Azara, Apunt. iii. p. 231. no. 369.

*Gallinula saracura*, Spix, Av. Bras. ii. p. 75, t. 98 (1825).

*Gallinula plumbea*, Max. Beitr. iv. p. 795; Tsch. F. P. *Aves*, p. 52.

*Aramides plumbeus*, Hartl. Ind. Az. p. 23; Gray, Gen. B. iii. p. 594; Burm. Syst. Ueb. iii. p. 383; Schlegel, M. de P.-B. *Ralli*, p. 15.

"*Rallus nigricans*, Vieill.;" Bp. J. A. S. Phil. iv. p. 386.

*Rallus melanurus*, Bp. J. A. S. Phil. v. p. 139.

*Supra saturate olivaceus, dorso superiore et collo rufescentibus, dorso inferiore cum cauda nigricantibus: pileo obscure cinereo: subtus omnino plumbeus, ventre imo nigricantiore, crisso nigro, gula alba: long. tota 15.5, alæ 7, caudæ 2.4, tarsi 3, rostri a rictu 2.4.*

*Hab.* Paraguay (Azara); Brasil. merid. or. (Max. et Burm.); Ypanema, S. Paolo (Natt.).

*Mus. Brit., S. & G.*

Several authors have called this bird *A. plumbeus*, from Vieillot's *Gallinula plumbea*, which, however, is a Javan species, and has nothing to do with it (*cf.* Enc. Méth. p. 344). Spix's name *saracura* seems to be the oldest.

#### 6. ARAMIDES AXILLARIS.

*Aramides axillaris*, Lawr. Proc. Acad. Phil. 1863, p. 107.

*Ortygarchus mangle*, Cab. in Schomb. Guian. iii. p. 760.

*Aramides ruficollis*, Léotaud, Ois. Trin. p. 498.

*Fusco-viridis, dorso imo et cauda nigris, dorso summo plumbeo: capite toto et corpore subtus castaneis: gula alba, ventre medio cum crisso nigris: primariis extus rufis: tectricibus subalaribus albo nigroque transfasciatis: long. tota 11.5, alæ 6.5, caudæ 2.0, tarsi 2.0, rostri a rictu 1.6.*

*Hab.* Venezuela, Barranquilla (Crowther); Brit. Guiana (Schomburgk); Belize (Bocourt).

*Mus. Brit., Derby, Paris.*

This is a very distinct species, easily known by its chestnut head and neck, which are nearly of the same colour as the body beneath. It is clearly the bird described by Cabanis as the adult of his *Ortygarchus mangle*, and by Léotaud as *A. ruficollis*.

#### 7. ARAMIDES MANGLE.

*Gallinula mangle*, Spix, Av. Bras. ii. p. 74, t. 97.

*Aramides mangle*, Burm. Syst. Ueb. iii. p. 385.

*Supra olivaceus, pileo et cervice cinerascens, dorso imo nigricante: subtus rufus; gutture albicante; ventre in cinereum trahente; crisso nigricante: tectricibus subalaribus nigris albo*

*transfasciatis*: long. tota 12·0, alæ 6·5, caudæ 2·3, tarsi 2·1, rostri a rictu 1·8.

*Hab.* Brazil (*Spix*); vicinity of Bahia (*Wucherer*).

*Mus.* S. & G.

### Genus 3. PORZANA.

	Type.
<i>Porzana</i> , Vieill. Analyse, p. 61 (1816).....	<i>P. maruetta</i> .
<i>Mustelirallus</i> , Bp. C. R. xliii. p. 599 (1856)	<i>P. albicollis</i> .
<i>Rufirallus</i> , Bp. C. R. xliii. p. 599 (1856) ..	<i>P. cayennensis</i> .
<i>Laterallus</i> , Bp. Ann. d. Sc. Nat. sér. 4. Zool.	
i. p. 46 (1854) .....	<i>P. melanophæa</i> .
<i>Laterirallus</i> , Bp. C. R. xliii. p. 599 (1856)..	<i>P. melanophæa</i> .
<i>Crybastes</i> , Cab. Journ. f. O. 1856, p. 428 ..	<i>P. flaviventris</i> .
<i>Creciscus</i> , Cab. Journ. f. O. 1856, p. 428 .	<i>P. jamaicensis</i> .
<i>Coturnicops</i> , Bp. Ann. Sc. Nat. sér. 4. Zool.	
i. p. 46 (1854) .....	<i>P. noveboracensis</i> .

The American species of this genus present many slight modifications in the proportions of the tarsus and toes, the elevation of the culmen of the bill, the length of the tail and tail-coverts, and the denudation of the lower part of the tibiæ. It appears to us impossible to establish satisfactory generic divisions upon these characters, at any rate without a careful examination of the Old-World species of the group. It is even difficult to group the American species in minor sections; but the following may serve as a temporary arrangement of the subgenera:—

<i>a.</i> majores: tarsus et digiti elongati.	
<i>a'</i> . dorso maculato .....	1. <i>Porzana</i> .
<i>b'</i> . dorso immaculato.	
<i>a''</i> . hypochondriis puris .....	2. <i>Rufirallus</i> .
<i>b''</i> . hypochondriis fasciatis .....	3. <i>Laterirallus</i> .
<i>b.</i> minores: tarsus brevis.	
<i>a'</i> . digiti elongati .....	4. <i>Crybastes</i> .
<i>b'</i> . digiti modici.	
<i>a''</i> . rostri culmine non elevato .....	5. <i>Creciscus</i> .
<i>b''</i> . rostri culmine elevato .....	6. <i>Coturnicops</i> .
<i>c.</i> major: tarsus et digiti breves.....	7. <i>Neocrex</i> .

### (1) PORZANA.

#### *Clavis specierum.*

<i>a.</i> loris et gula nigris: dorso albo lineolato .....	1. <i>P. carolina</i> .
<i>b.</i> loris cinereis: gula alba: dorsi lineolis nullis.....	2. <i>P. albicollis</i> .

#### 1. PORZANA CAROLINA.

*Rallus carolinus*, Linn. S. N. i. p. 363.

*Ortygometra carolina*, Gosse, Birds of Jamaica, p. 371; Léotaud, Ois. Trinid. p. 493.

*Porzana carolina*, Baird, Birds N. Am. p. 749; Gundl. Journ. f. Orn. 1856, p. 428; Scl. P. Z. S. 1861, p. 81, 1864, p. 179; Scl. & Salv. P. Z. S. 1864, p. 372; Ibis, 1859, p. 230; A. & E. Newton, Ibis, 1859, p. 260; Lawr. Ann. L. N. Y. vii. p. 479.

*Rallus stolidus*, Vieill. Enc. Méth. p. 1071.

*Supra olivaceo-brunneus : nigro variegatus et lineolis albis notatus : facie et pileo medio nigris : superciliis cinereis : subtus cinereus, gulu et cervice mediali nigris : lateribus albo nigroque transfasciatis : ventre medio et crisso albis, hoc fulvescente tincto : rostro flavo, pedibus olivaceis : long. tota 7·5, alæ 4·1, caudæ 1·8, tarsi 1·3, dig. med. cum ungue 1·7, rostri a rictu 0·9.*

*Hab.* America bor. univ. (*Baird*); Mexico (*White*); Guatemala (*Salvin*); Jamaica (*Gosse*); Panama (*McCleann.*); Cuba (*Gundl.*); S. Croix (*Newton*); Trinidad (*Léotaud*).

*Mus.* Brit., S. & G., *Derb.*

## 2. PORZANA ALBICOLLIS.

*Rallus albicollis*, Vieill. N. D. xxviii. p. 560, et Enc. Méth. p. 1069 (ex Azara, no. 374).

*Rallus olivaceus*, Vieill. N. D. xxviii. p. 561; Enc. Méth. p. 1068.

*Corethrura olivacea*, Léotaud, Ois. de l'Île de Trinidad, p. 499; Gray, Gen. iii. p. 595.

*Crex olivacea*, Taylor, Ibis, 1864, p. 96.

*Ortygometra albicollis*, Burm. Syst. Ueb. iii. p. 387; Hartl. Ind. Az. p. 25.

*Porzana albicollis*, Schlegel, Mus. d. P.-B. *Ralli*, p. 34.

*Mustelirallus albicollis*, Bp. C. R. xliii. p. 599.

*Crex mustelina*, Licht. Doubl. p. 79; Schomb. Guian. iii. p. 760.

*Crex gularis*, Jard. & Selb. Ill. Orn. i. t. 39.

*Supra olivaceo-brunneus, nigro variegatus : subtus cinereus, gula alba : hypochondriis et crisso nigris albo variegatis : rostro flavicante, pedibus olivaceis : long. tota 9·0, alæ 4·4, caudæ 2·0, tarsi 1·55, dig. med. cum ungue 1·7, rostri a rictu 1·1.*

*Hab.* Paraguay (*Azara*); South Brazil, S. Paulo (*Burm.*); Surinam (*Schlegel*); Cayenne (*Poiteau*, in *Mus. Paris.*); Trinidad (*Léotaud* & *Taylor*).

## (2) RUFIRALLUS.

a. supra olivacei.

*Clavis specierum.*

a'. pileo rufo ..... 3. *P. cayanensis*.

b'. pileo olivaceo ..... 4. *P. leiraudi*.

b. supra castanei.

a'. pileo plumbeo ..... 5. *P. rubra*.

b'. pileo dorso concolori ..... 6. *P. concolor*.

c'. pileo ventre concolori ..... 7. *P. castaneiceps*.

## 3. PORZANA CAYANENSIS.

*Le râle de Cayenne*, Buff. Pl. Enl. 368.

*Rallus cayanensis*, Gm. S. N. i. p. 718.

*Ortygometra cayennensis*, Burm. S. U. iii. p. 386.

*Porzana cayennensis*, Scl. & Salv. P. Z. S. 1867, p. 592.

*Rallus kiolo*, Vieill. Enc. Méth. p. 1066.

*Crex aurita*, J. E. Gray, Zool. Misc. p. 13.

*Gallinula pileata*, Max. Beitr. iii. p. 802.

*Gallinula ecaudata*, Sw. An. in Men. p. 348.

*Râle a ventre roux de Cayenne*, Buff. Pl. Enl. 753; *undè Rallus poliotis*, Temm. Table d. Pl. Enl. p. 98.

*Supra olivaceus*: pileo castaneo: lateribus capitis cinereis: subtus castaneus: rostro plumbeo; pedibus carneis: long. tota 6·0, alæ 3·5, caudæ 1·3, tarsi 1·35, dig. med. cum ungue 1·4, rostri a rictu 0·8.

*Hab.* Cayenne (*Buffon*); Para (*Wallace*); Brasil. merid. orient. (*Max. & Burmeister*).

*Mus.* Brit., S. & G.

4. PORZANA LEVRAUDI, sp. nov. (Plate XXXV.)

*Supra omnino fuscescenti-olivaceus, alis extus et cauda saturatioribus, fere nigricantibus: subtus rubiginoso-rufus, medialiter dilutior: gula et pectore medio albis: rostro et pedibus olivaceis: long. tota 6·0, alæ 3·0, caudæ 1·5, rostri a rictu 0·8, tarsi 1·1.*

*Hab.* Venezuela, in vicin. urbis Caraccas (*Levraud*).

*Mus.* Parisiensi.

*Obs.* Species forma et crassitie *Porzanæ cayennensis*, sed differt corpore supra unicolori, subtus medialiter albo.

5. PORZANA RUBRA.

*Corethrura rubra*, Scl. & Salv. P. Z. S. 1860, p. 300; *Ibis*, 1860, p. 277.

*Porzana rubra*, Scl. & Salv. Ex. Orn. t. xvi. p. 31.

*Læte rufa, subtus medialiter dilutior; gula albicantiore; pileo toto et lateribus capitis saturate cinereis: remigibus et rectricibus cum uropygio obscure fusco-nigris: rostro nigro: pedibus olivaceis: long. tota 6·0, alæ 3·3, caudæ 1·4, tarsi 1·35, digiti med. cum ungue 1·55, rostri a rictu 0·85.*

*Hab.* Guatemala (*Salvin*).

*Mus.* Brit., S. & G.

6. PORZANA CONCOLOR.

*Rallus concolor*, Gosse, B. Jam. p. 369, et Ill. t. 103 (1847); *March*, Proc. Acad. Phil. 1864, p. 69.

"*Rallus castaneus*, Cuv.," Puch. R. Z. 1851, p. 279.

*Rallina castanea*, Schlegel, Mus. de P.-B. *Ralli*, p. 17.

*Corethrura guatemalensis*, Lawr. Proc. Acad. Phil. 1863, p. 106.

*Corethrura cayennensis*, Moore, P. Z. S. 1859, p. 64; Scl. & Salv. *Ibis*, 1859, p. 230.

*Supra omnino fusco-rubiginosus unicolor: subtus pure rubiginoso-rufus: long. tota 8·5, alæ 4·8, caudæ 2·6, tarsi 1·7, rostri a rictu 1·1.*

*Hab.* Jamaica (*Gosse*); Honduras, Omoa (*Leyland*); Guatemala (*Lawrence*); vicinity of Bahia (*Wucherer*).

*Mus.* Brit., Derb., Paris., S. & G.

We have compared *Leyland's* specimen of this bird from Omoa with *Gosse's* type from Jamaica, which is now in the British Museum, and find them identical. We therefore conclude that Mr.

Lawrence's *Corethrura guatemulensis* is referable to this species, as his description shows no reason to the contrary.

We have also examined the type of *Rallus castaneus* (Puch. ex Cuv.) in the Paris Museum, and have no doubt of its being a synonym of *Rallus concolor*, Gosse.

Prince Bonaparte names (C. R. xliii. p. 599), without describing, a *Rufirallus boeckii* from the Berlin Museum. Schlegel (*l. s. c.*) states that one of the types of this supposed new species is in the Leyden Museum, and places it as a synonym of this bird, which he calls *Rallina castanea*.

#### 7. PORZANA CASTANEICEPS, sp. nov.

*Supra olivacea: capite undique et corpore subtus ad imum pectus castaneis, gula dilutiore: ventre imo, tibiis et hypochondriis dorso concoloribus: long. tota 8.0, alæ 4.4, rostri a rectu 1.1, tarsi 2.0.*

*Hab.* Rio Napo (*Mus. Brit.*).

*Mus. Brit.*

There is a single example of this apparently undescribed species in the British Museum. It was purchased from Mr. Gould in 1855. The species is nearly allied to *P. concolor*, but is easily recognizable by the chestnut colouring only extending over the head and front part of the body below.

### (3) LATERIRALLUS.

#### *Clavis specierum.*

- |  |                            |
|--|----------------------------|
| <i>a.</i> gula cum pectore castaneis .....           | 8. <i>P. hauxwelli.</i>    |
| <i>b.</i> gula alba, pectore albo aut rufo.          |                            |
| <i>a'</i> . erisso rufo .....                        | 9. <i>P. melanophæa.</i>   |
| <i>b'</i> . erisso albo nigroque transfasciato ..... | 10. <i>P. albigularis.</i> |
| <i>c'</i> . erisso medio nigro utrinque albo .....   | 11. <i>P. leucopyrrha.</i> |

#### 8. PORZANA HAUXWELLI, sp. nov.

*Corethrura*, sp. ?, *Scl. & Salv. P. Z. S.* 1866, p. 200.

*Porzana fasciata*, *Scl. & Salv. P. Z. S.* 1867, p. 981.

*Porzana hauxwelli*, *Scl. & Salv. Ex. Orn.* p. 105, t. 53.

*Fuscescenti-olivacea, alis obscurioribus, capite toto cum collo et corpore subtus ad imum pectus castaneis: abdomine rufo nigroque transfasciato: subalaribus rufis nigro maculatis: rostro obscure corneo, pedibus saturate corylinis: long. tota 6.5, alæ 3.5, caudæ 1.2, tarsi 1.6, rostri a rectu 0.85.*

*Hab.* Amazonia Peruviana; Ucayali (*Bartlett*), Chamicurros et Pebas (*Hauxwell*).

*Mus. Brit., S. & G.*

*Obs.* Similis *P. castaneo*, sed ventre rufo nigroque conspicue transfasciato.

#### 9. PORZANA MELANOPHÆA.

*Ypecaha pardo obscuro*, Azara, *Apunt.* iii. p. 230. no. 376.

*Rallus melanophæus*, Vieill. *N. D.* xxviii. p. 549, et *Enc. Méth.* p. 1064.

PROC. ZOOL. SOC.—1868, No. XXX.

*Corethrura melanophæa*, Hartl. Ind. Az. p. 24; Gray, Gen. iii. p. 595.

*Crex lateralis*, Licht. Doubl. p. 79.

*Gallinula lateralis*, Max. Beitr. iv. p. 805.

*Ortygometra lateralis*, Burm. Syst. Ueb. iii. p. 387.

*Gallinula albifrons*, Sw. An. in Menag. p. 338.

*Porzana melanophæa*, Scl. & Salv. Ex. Orn. p. 107, t. 54.

*Fuscescenti-olivacea, alis extus et dorso postico obscurioribus; subtus alba, lateribus cervicis et pectoris cum crisso toto rufis; hypochondriis albo nigroque transfasciatis: rostro olivaceo apice flavicante; pedibus pallide corylinis: long. tota 6·3, alæ 3·1, caudæ 1·5, tarsi 1·25, rostri a rictu 0·8.*

*Hab.* in Brasil. merid. (*Burmeister*); Paraguaya (*Azara*); Bolivia, Chiquitos (*D'Orbigny*); Venezuela, Cumana (*Beaupérthuy*); Caraccas (*Levaud*).

*Mus.* Brit., S. & G.

#### 10. PORZANA ALBIGULARIS.

*Corethrura albigularis*, Lawrence, Ann. Lyc. N. Y. vii. p. 302; Scl. & Salv. P. Z. S. 1864, p. 372.

*Porzana albigularis*, Scl. & Salv. P. Z. S. 1867, p. 280, et Ex. Orn. p. 109, t. 55.

*Supra fusca, lateribus capitis et cervice postica castaneis: subtus alba, pectore castaneo perfuso: hypochondriis, ventris lateribus et crisso albo nigroque transfasciatis: rostro olivaceo, pedibus fuscis: long. tota 5·5, alæ 2·9, caudæ 1·1, tarsi 1·1, rostri a rictu 0·9.*

*Hab.* in isthm. Panama (*M'Leannan*); Costa Rica (*Arcé*); Mosquitia (*Wickham*).

*Mus.* S. & G.

#### 11. PORZANA LEUCOPYRRHA.

*Ypecaha pardo acanelado y blanco*, Azara, Apunt. iii. p. 228. no. 375.

*Rallus leucopyrrhus*, Vicill. N. D. xxvii. p. 550, et Enc. Méth. p. 1064; v. Schreiber, Isis, 1823, p. 1063.

*Corethrura leucopyrrha*, Hartl. Ind. Az. p. 24; Gray, Gen. iii. p. 595; Burm. La Plata-Reise, ii. p. 505.

*Corethrura hypoleucos*, Licht. in Mus. Berol. et Nomencl. p. 96.

*Laterirallus hypoleucus*, Bp. C. R. xliiii. p. 599.

*Fuscescenti-olivacea, capite rufescente, alis extus et cauda cum dorso postico obscurioribus: subtus alba; lateribus capitis, cervicis et pectoris castaneis; hypochondriis albo nigroque transfasciatis: crisso medio nigro, lateraliter albo: rostro olivaceo, pedibus flavidis: long. tota 6·75, alæ 3·1, caudæ 1·9, tarsi 1·3, rostri a rictu 0·8.*

*Hab.* in Paraguaya (*Azara*); rep. Argentina, Tucuman (*Burm.*); Brasil. merid. (*Natt.*).

*Mus.* Brit., S. & G.

*Obs.* A *P. melanophœa* capite rufo, et crisso non rufo, sed medio nigro, albo utrinque marginato, diversa.

## (4) CRYBASTUS.

## 12. PORZANA FLAVIVENTRIS.

*Petit râle de Cayenne*, Buff. Pl. Enl. 847.

*Rallus flaviventer*, Bodd.

*Ortygometra flaviventris*, Gray, Gen. iii. p. 593; Hartl. Ind. Az. p. 24.

*Rallus minutus*, Gm. S. N. p. 719.

*Ortygometra minuta*, Burm. Syst. Ueb. iii. p. 388; Gosse, B. Jam. p. 372.

*Crex minuta*, Scl. P. Z. S. 1861, p. 81.

*Rallus superciliaris*, Vieill. N. D. xxviii. p. 565, et Enc. Méth. p. 1070 (ex Azara, no. 377).

*Laterirallus gossii*, Bp. C. R. xliii. p. 599 (1856).

*Crybastus gossii*, Cab. J. f. Orn. 1856, p. 428; Gundlach, Rep. F. N. i. p. 361.

*Erythra minuta*, Bp. C. R. xliii. p. 600 (1856).

*Supra flavicanti-brunnea, capite et dorso medio obscurioribus, nigricanti-brunneis: dorso et alis extus albo maculatis: superciliis et corpore subtus ochraceo-albidis, gula et ventre medio albicantibus: hypochondriis et crisso albo nigroque transfasciatis: rostro corneo, pedibus flavis: long. tota 5·0, alæ 2·7, caudæ 1·3, rostri a ricu 0·7, tarsi 0·9, dig. med. cum ungue 1·3.*

*Hab.* Cayenne (*Buff.*); Jamaica (*Gosse et Osburn*); Cuba (*Gundlach*); Venezuela, Caraccas (*Levraud, in Mus. Par.*); South-eastern Brazil (*Burm.*); Paraguay (*Azara*).

Bonaparte has called the Jamaican form of this species *Laterirallus gossii*, without giving us any explanation of how it differs from the continental form which he calls *Erythra minuta*. We have examined a specimen now in the British Museum, obtained by Gosse, and compared it with a skin from Brazil, without being able to detect any differences which would justify the separation of the Jamaican bird.

## (5) CRECISCUS.

a. plaga cervicali postica nulla.

a'. pectore immaculato.

a'', dorso toto albo punctato ..... 13. *P. jamaicensis*.

b'', dorso fere immaculato ..... 14. *P. spilonota*.

b'. pectore albo nigroque variegato ..... 15. *P. notata*.

b. plaga cervicali postica rufa ..... 16. *P. cinerca*.

## 13. PORZANA JAMAICENSIS.

*Rallus jamaicensis*, Gm. S. N. p. 718; Baird, Birds N. Am. p. 749.

*Ortygometra jamaicensis*, Gosse, B. Jam. p. 375; Salv. Ibis, 1866, p. 198.

*Porzana jamaicensis*, Scl. P. Z. S. 1861, p. 81; P. Z. S. 1867, p. 333 et p. 343; Schlegel, Mus. des P.-B. *Ralli*, p. 67.

*Creciscus jamaicensis*, Cab. J. f. Orn. 1856, p. 428; Gundl. Rep. F. N. i. p. 362.

*Rallus salinasi*, Philippi, Wieg. Arch. 1857, p. 262.

*Crex pygmæa*, Blackwall, Brewster's Journ. vi. p. 77 (1832).

*Ortygometra jamaicensis* et *O. chilensis*, Bp. C. R. xliii. p. 599.

*Supra cinerea, brunneo, præcipue in dorso summo, perfusa: capite, dorso toto et alis extus albo stellatis: subtus cinerea, gula (in junioribus) albescente: hypochondriis, ventre imo et crisso albo transfasciatis: rostro plumbeo, pedibus pallide corylinis: long. tota 5·5, alæ 2·9, caudæ 1·4, rostri a rictu 0·7, tarsi 0·9, dig. med. cum ungue 1·15.*

*Hab.* Amer. bor. status Atlanticos merid. (*Baird*); Jamaica (*Osburn*); Cuba (*Gundl.*); Guatemala (*Salvin*); New Granada (*Schlegel*); Lima (*Nation*); Chili (*Philippi*).

*Mus.* Brit. et S. & G.

We have compared skins of this bird from Guatemala, Jamaica, Lima, and Chili, without being able to detect any differences sufficient to distinguish them specifically. In some specimens the throat is nearly white; but this occurs in one skin from Chili, and not in a second, and may be attributable to immaturity. The southern specimens are also rather larger.

*Ortygometra chilensis* is a name probably intended by Bonaparte for this southern form, which seems also to be described by Philippi as *Rallus salinasi* (*l. s. c.*).

#### 14. PORZANA SPILONOTA.

*Zapornia spilonota*, Gould, Zool. Voy. Beagle, iii. p. 132, t. 49.

*Nigricanti-cinerea fere unicolor, dorso et alis extus oleagineo perfusis: hypochondriis et tectricibus caudæ inferioribus obsolete albo notatis: long. tota 5·25, alæ 2·75, caudæ 1·1, tarsi 0·85, rostri 0·75.*

*Hab.* Galapagos (*Darwin*).

*Mus.* Brit.

*Obs.* Affinis *P. tabuensi* ex inss. maris Pacifici.

#### 15. PORZANA NOTATA.

*Zapornia notata*, Gould, Zool. Voy. Beagle, iii. p. 132, t. 48.

*Supra obscure olivaceo-brunnea, albo stellata: subtus nigra albo omnino variegata: long. tota 5·5, alæ 3·0, caudæ 1·3, tarsi 0·9, rostri a rictu 0·5.*

*Hab.* in rep. Argentina (*Darwin*); Patagonia (*D'Orb. in Mus. Par.*).

*Mus.* Brit. et Paris.

#### 16. PORZANA CINEREA.

*Rallus cinereus*, Vieill. N. D. xxviii. p. 556, et Enc. Méth. p. 1066.

*Ortygometra cinerea*, Gray, Gen. B. iii. p. 593; Léotaud, Ois. de Trin. p. 495.

*Gallinula ruficollis*, Sw. An. in Men. p. 349.

*Rallus exilis*, Temm. Pl. Col. 523.

*Porzana exilis*, Scl. & Salv. P. Z. S. 1866, p. 567.



*Supra olivaceo-brunnea, pileo cinereo, cervice rufa, uropygio nigro albo transfasciato: subtus cinerea, gula alba, ventris lateribus et crisso nigris albo transfasciatis: rostro corneo, pedibus pallidis: long. tota 5·0, alæ 2·8, caudæ 1·4, rostri a rictu 0·65, tarsi 0·8, dig. med. cum ungue 1·1.*

*Hab.* Cayenne (Vieill.); Amazonia Peruv., Ucayali (Bartlett); Para (*Mus. Derb.*); Trinidad (Léotaud).

*Mus.* Brit., Paris., et S. & G.

#### (6) COTURNICOPS.

##### 17. PORZANA NOVEBORACENSIS.

*Fulica noveboracensis*, Gm. S. N. i. p. 701.

*Gallinula noveboracensis*, Lath. Ind. Orn. ii. p. 271.

*Porzana noveboracensis*, Baird, B. N. A. p. 750.

*Rallus ruficollis*, Vieill. N. D. xxviii. p. 556, Enc. Méth. p. 1070, et Gal. d. Ois. ii. t. 266.

*Supra ochracea brunneo variegata, dorso et alis extus albo anguste transfasciatis: superciliis gula et pectore pure ochraceis: ventre medio albicante: hypochondriis nigris ochraceo mixtis et albo transfasciatis: crisso rufescente: rostro pallide corneo, basi albicante: pedibus pullidis: long. tota 6·5, alæ 3·5, caudæ 1·4, rostri a rictu 0·7, tarsi 1·0, dig. med. cum ungue 1·2.*

*Hab.* America bor. status Atlanticos et merid.

*Mus.* S. & G.

#### (7) NEOCREX.

##### 18. PORZANA ERYTHROPS.

*Porzana erythrope*, Selater, P. Z. S. 1867, p. 343, t. 21.

*Porzana schomburgki*, Schl. Mus. des P.-B. Ralli, p. 37 (?).

*Supra fusciscenti-olivacea, alis et cauda concoloribus: capitis et cervicis lateribus cum corpore subtus pallide plumbeis, gula albicante: hypochondriis, alarum tectricibus inferioribus et crisso nigricantibus albo transfasciatis, uno fulvescente: rostro ad basin sanguineo, inde corneo, apice flavo: pedibus flavis: long. tota 7·5, alæ 4·2, caudæ 1·2, rostri a rictu 0·9, tarsi 1·2, dig. med. cum ungue 1·3.*

*Hab.* Lima (*Nation*).

*Mus.* S. & G.

#### Genus 4. CREX.

Type.

*Crex*, Bechst. Gem. Naturg. p. 470 (1803) . . . *Crex pratensis*.

*Ortygometra*, Leach, Syst. Cat. p. 34 (1816) . . *Crex pratensis*.

##### CREX PRATENSIS.

*Rallus crex*, Linn. S. N. i. p. 261.

*Crex pratensis*, Bechst. Nat. iv. p. 470; Baird, B. N. A. p. 751.

*Flavicanti-brunnea, nigro variegata, alis extus rufis: subtus cinereo-albida, gula et abdomine medio dilutioribus: hypochondriis rufo*

*variegatis: subalaribus rufis: long. tota 10·5, alæ 5·8, caudæ 2·1, rostri a rictu 1·15, tarsi 1·55, dig. med. cum ungue 1·6.*

*Hab.* accidentaliter in America boreali (*Baird*).

Genus 5. THYRORRHINA\*.

THYRORRHINA SCHOMBURGI.

*Crex schomburgki*, Cab. in Schomb. Guian. ii. p. 245, et iii. p. 760; Sel. & Salv. P. Z. S. 1868, p. 169.

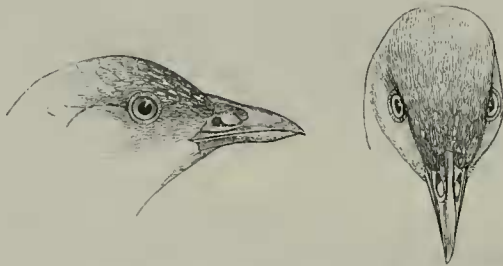
*Micropygia schomburgki*, Bp. C. R. xliii. p. 599.

*Supra olivacea albo guttata, his maculis albis nigro circumdatis: subtus rubiginosa, gula albicante, abdomine medio albo: rostro corneo, mandibulæ apice flavo: pedibus aurantiacis: long. tota 5·0, alæ 3·3, caudæ 1·4, rostri a rictu 0·6, tarsi 0·85, dig. med. cum ungue 0·9.*

*Hab.* Brit. Guiana (*Schomb.*); Venezuela, Caripé (*Goering*); Caracas (*Levrard, in Mus. Paris.*).

*Mus.* S. & G.

Fig. 1.



Head of *Thyrorrhina schomburgki*.

The peculiar form of the nasal openings, which are partly covered over in front by a horny membrane and are completely divided from each other by a median septum, induces us to refer this species to a new genus, these characters not occurring in any other American form of *Rallinæ*. In other respects this little Crane agrees generally with the smaller American species of *Porzana*. The form of the wing corresponds nearly with that of *P. noveboracensis*, the second and next three following primaries being nearly equal and longest, and the external secondaries elongated, so as to be longer than the outer primary. The toes are slender, the middle toe with its nail hardly exceeding the tarsus in length. The tibiæ are feathered nearly down to the joint. The tail is rather longer than is usual among the smaller *Rallidæ*, and not so much concealed by the coverts.

Dr. Schlegel's *Porzana schomburgki* (*Mus. des P. B. Ralli*, p. 37) can hardly be of this species, if his description is correct †. It would appear to be more like Selater's *P. erythropis*, to which, therefore, we have provisionally referred it.

\* *Θυρῶς, porta, et ῥῖς, nasus.*

† Dessus d'un brun olivâtre. Dessous gris d'ardoise; bas ventre et sous-caudales noires avec des bandelettes blanches.

## Subfam. II. FULICINÆ.

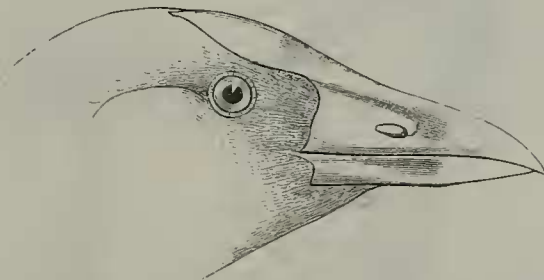
*Conspectus generum Fulicinarum.*

- a.* digiti membrana laterali omnino carentes: nares ovales ... 6. *Porphyrio*.  
*b.* digiti membrana laterali instructi: nares lineariformes.  
 · *a'*. digitorum membrana angusta, continua.  
     *a''*. clypeo frontali parvo, triquetro, elevato ..... 7. *Porphyriops*.  
     *b''*. clypeo frontali expanso, rotundato ..... 8. *Gallinula*.  
*b.* digitorum membrana lobiformi ..... 9. *Fulica*.

## Genus 6. PORPHYRIO.

	Type.
<i>Porphyrio</i> , Temm. ....	<i>P. antiquorum</i> .
<i>Ionornis</i> , Reichenb. Nat. Syst. p. xxi (1853) ..	<i>P. martinicus</i> .
* <i>Porphyryla</i> , Bp. C. R. xliii. p. 599 (1851) ....	<i>P. martinicus</i> .
<i>Glaucestes</i> , Reichenb. Nat. Syst. p. xxi (1853)..	<i>P. parvus</i> .

Fig. 2.

Head of *Porphyrio martinicus*, showing the oval nostril.

## I. PORPHYRIO MARTINICUS.

*Fulica martinica*, Linn. S. N. i. p. 259.

*Gallinula martinica*, Lath. Ind. Orn. ii. p. 812.

*Gallinula martinicensis*, Max. Beitr. iv. p. 812.

*Crex martinica*, Licht. Doubl. p. 79.

*Porphyrio martinica*, Temm. Pl. Col. 405 (text); Burm. Syst. Ueb. iii. p. 392; Gosse, B. Jam. p. 377; Schomb. Guian. iii. p. 761; Selater, P. Z. S. 1861, p. 81; Sel. & Salv. P. Z. S. 1864, p. 372, et 1867, p. 592; Ibis, 1859, p. 230; Moore, P. Z. S. 1859, p. 64; Taylor, Ibis, 1864, p. 96 et p. 171; Léotaud, Ois. Trin. p. 501.

*Ionornis martinicensis*, Reichenb. Nat. Syst. p. xxi.

*Gallinula martinica*, Baird, B. N. A. p. 753; Selater, P. Z. S. 1864, p. 179.

*Porphyrio tavoua*, Vieill. Gal. ii. t. 267.

*Porphyryla martinica*, Bp. C. R. xliii. p. 599 (1856); Gundlach, Rep. F. N. i. p. 362.

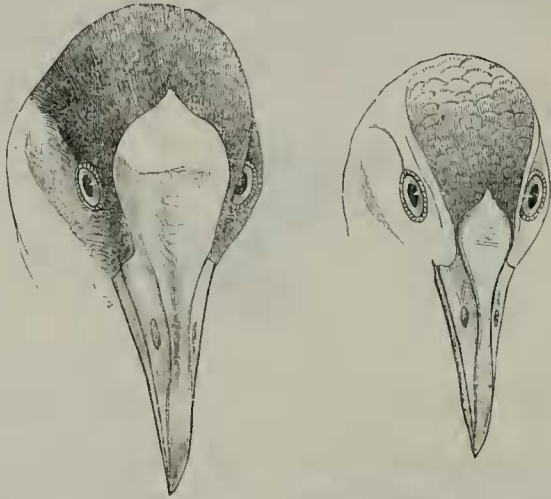
\* *Porphyryla* is a genus originally established by Blyth (Cat. B. As. S. Mus. p. 283), of which the type is *Porphyrio chloronotus*, described by Blyth (J. A. S. B. xviii. p. 283) from an unknown locality. Bonaparte misapplied this term to *P. martinicus*, and has misled Baird (B. N. A. p. 753) into following him.

*Supra viridis, alis extus et cervice postica cæruleo lavatis: occipite nigricante: subtus purpureus, ventre imo nigricante, crisso albo: scuto frontali cærulescente, rostro coccineo, apice flavo: pedibus flavidis: long. tota 10·0, alæ 6·8, caudæ 2·8, rostri a rictu 1·2, tarsi 2·2, dig. med. cum ungue 2·9.*

*Avis jr. Supra olivaceus, alis extus cæruleo tinctis: capite, collo et dorso postico brunnescentibus: subtus albus, ochraceo perfusus.*

*Hab.* Americæ bor. st. Atlanticos merid. (*Baird*); Guatemala (*Salvin*); Cuba (*Gundlach*); Jamaica (*Gosse et Osburn*); Porto Rico (*Taylor*); Trinidad (*Léotaud*); British Guiana (*Schomb.*); Para (*Wallace*); South-eastern Brazil (*Max. et Burm.*); Paraguay (*Azara*).  
*Mus.* Brit., S. & G.

Fig. 3.

*Porphyrio martinicus.**Porphyrio parvus.*

## 2. PORPHYRIO PARVUS.

*Favorite de Cayenne*, Buff. Pl. Enl. 897.

*Fulica parva*, Bodd.

*Gallinula flavirostris*, Gm. S. N. p. 699.

*Gallinula parva*, Schlegel, Mus. d. P.-B. *Ralli*, p. 39.

*Porphyrio parvus*, Scl. & Salv. P. Z. S. 1867, p. 592.

*Glaucetes flavirostris*, Reichenb. Nat. Syst. p. xxi.

*Porphyryla martinica*, Bp. C. R. xliii. p. 599 (*partim*).

*Supra cærulescenti-viridescens, medialiter brunnescens: dorso postico nigricante: subtus pure albus, capite et cervice lateraliter cæruleo perfusis: scuto frontali et rostro flavicanti-olivaceis: pedibus flavis: long. tota 9·0, alæ 5·0, caudæ 2·7, rostri a rictu 1·0, tarsi 1·75, dig. med. cum ungue 2·5.*

*Hab.* Cayenne (*Buff.*); Surinam (*Mus. Lugd.*); Amazons (*Wallace*); Brasil. int. Rio Araguay (*Natterer*).

*Mus.* Brit., S. & G.

*Obs.* Cum juniore sp. præc. sæpe confusus, sed scuto frontali

parvo triquetro, crassitie minore, et corpore subtus pure albo facile distinguendus!

Genus 7. PORPHYRIOPS.

*Porphyriops*, Puch. R. Z. 1845, p. 278.

*Hydrocicca*, Cab. Wieg. Arch. 1847, p. 351.

1. PORPHYRIOPS CRASSIROSTRIS.

*Fulica crassirostris*, J. E. Gray, Griffith's A. K. iii. p. 542.

*Gallinula crassirostris*, Darwin, Zool. Beagle, iii. p. 133; Bridges, P. Z. S. 1843, p. 118; Pelzeln, Novara-Reise, Vög. p. 135; Schl. Mus. d. P.-B. Ralli, p. 49.

*Porphyriops crassirostris*, Salvad. Att. Sc. It. viii. p. 285.

*Hydrocicca melanops*, Scater, P. Z. S. 1867, p. 333.

*Olivaceus, pileo medio obscuriore: alis fuscis, harum tectricibus castaueo perfusis, secundariis externis albicante marginatis: subtus cinereus, ventre medio et crisso albo; hypochondriis olivaceo perfusis et albo maculatis: rostro obscure olivaceo, apice flavicante; pedibus corylinis: long. tota 9, alæ 5·2, caudæ 2·2, rostri a rictu 0·95, tarsi 1·8, digiti medii cum ungue 2·5.*

*Hab.* Chili (*Bridges, Leybold*).

*Mus.* Brit., S. & G.

2. PORPHYRIOPS MELANOPS.

*El cara negra*, Azara, Apunt. iii. p. 223. no. 373.

*Rallus melanops*, Vieill. N. D. xxviii. p. 553, et E. M. p. 1065.

*Hydrocicca melanops*, Cab. Wieg. Arch. 1847, p. 351.

*Ortygometra melanops*, Burm. La Plata, ii. p. 505.

*Crex femoralis*, Tsch. Wieg. Arch. 1843, pt. 1. p. 388, et F. P. *Aves*, p. 301(?).

*Anaurornis femoralis*, Bp. C. R. xliii. p. 600(?).

*Porphyriops leucopterus*, Salvadori, Att. S. I. viii. p. 382; Sc. & Salv. P. Z. S. 1868, p. 175.

*Sim. præc. sed minor, pileo medio obscuriore, et remigibus secundariis intus et extus albo mugis distincte notatis: long. tota 7·5, alæ 4·9, caudæ 2·3, tarsi 1·4, digiti medii cum ungue 1·8, rostri a rictu 0·9.*

*Hab.* Paraguay (*Azara*); Bogota (*Mus. Derb.*); Bolivia (*D'Orb. in Mus. Paris.*); Peru (*Tschudi*); New Granada (*Mus. Derb.*).

*Mus.* Derb.

We have examined the type specimen of *P. leucopterus* of Salvadori, which has been kindly lent to us by the describer, and find it distinguishable from the Chilian bird by the characters above given. If the locality of "Paraguay," assigned to it by Dr. Salvadori, is correct, it seems probable that all the birds met with on the eastern slope of the Andes will turn out to be of this form. But we have as yet only been able to examine one Cisandean specimen, from New Granada, in the Derby Museum. This certainly belongs to the white-winged form. We shall not consider the specific dis-

tinctness of the two forms established until we have had an opportunity of examining a series of specimens from several localities.

## Genus 8. GALLINULA.

Type.

*Gallinula*, Latham, Ind. Orn. ii. p. 770 . . . . . *G. chloropus*.

## GALLINULA GALEATA.

*Crex galeata*, Licht. Doubl. p. 80 (1823).

*Tahana*, Azara, Apunt. iii. p. 238.

*Gallinula galeata*, Max. Beitr. iv. 807 (1833); Schomb. Guian. iii. p. 760; Tsch. F. P. *Aces*, p. 302; Gay, Faun. Cbil. *Aves*, p. 437; Burm. S. U. iii. p. 389; Burm. La Plata-Reise, ii. p. 505; Gosse, Birds of Jamaica, p. 381; A. & E. Newton, Ibis, 1859, p. 260; Taylor, Ibis, 1860, p. 314; Salv. Ibis, 1866, p. 198; Scl. P. Z. S. 1861, p. 81, et 1867, p. 339; Scl. & Salv. P. Z. S. 1868, p. 176; Sallé, P. Z. S. 1857, p. 237; Gundl. Rep. F. N. p. 362; Bryant, Proc. Bost. Soc. xi. p. 97; Léotaud, Ois. de Trin. p. 503.

*Ardesiacus*: dorso medio et alis extus olivaceis in brunneum trahentibus, ventre medio albicante; margine alari, strigis hypochondriorum elongatis et crisso pure albis, hujus plumis mediis et caudæ rectricibus nigris: clypeo frontali et rostro coccineis, hujus apice flavo: pedibus olivaceis flavo variegatis; tibiæ parte nuda sanguineo-rubra: long. tota 15·0, alæ 7·5, caudæ 3·3, rostri a rictu 1·5, tarsi 2·3, digiti med. cum ungue 3·7.

*Hab.* Americæ bor. stat. merid. (*Baird*); Cuba (*Gundlach*); Jamaica (*Gosse* et *Osburn*); St. Domingo (*Bryant*); Trinidad (*Léotaud*); Guatemala (*Salvin*); St. Croix (*Newton*); Guiana (*Schomb.*); Brazil (*Max.* et *Burm.*); Paraguay (*Azara*); Honduras (*G. C. Taylor*); St. Domingo (*Sallé*); Chili (*Gay*); Peru (*Tschudi* et *Whitely*).

*Mus.* Brit., S.-G.

## Genus 9. FULICA.

Type.

*Fulica*, Linn. S. N. i. p. 277 (1766) . . . . . *F. atra*.

*Phalaris*, Reich. Nat. Syst. p. 21 (1852) . . . . . *F. gigantea*.

*Lysea*, Reich. Nat. Syst. p. 21 (1852) . . . . . *F. ardesiaca*.

*Lycornis*, Bp. Ann. Sc. Nat. ser. 4, Zool. i. p. 46 (1854) . . . . . *F. cornuta*.

*Clavis specierum Americanarum.*

- a. clypeo frontali carunculato . . . . . 1. *cornuta*.  
 b. clypeo frontali laevi.  
   a'. crisso præcipue nigro, lateraliter albo mixto.  
     major: flexura alari nigra . . . . . 2. *gigantea*.  
     minor: flexura alari alba . . . . . 3. *ardesiaca*.  
   b'. crisso præcipue albo.  
     a''. secundariis omnino concoloribus.  
       margine alari albo . . . . . 4. *armillata*.  
       margine alari concolori . . . . . 5. *leucopyga*.  
     b''. secundariis albo terminatis.  
       major: rostro flavo . . . . . 6. *leucoptera*.  
       minor: rostro rubro notato . . . . . 7. *americanu*.

1. *FULICA CORNUTA.*

*Fulica cornuta*, Bp. C. R. xxxvii. p. 925 (1853); Hartl. J. f. Orn. i. Extra-H. 1853, p. 82.

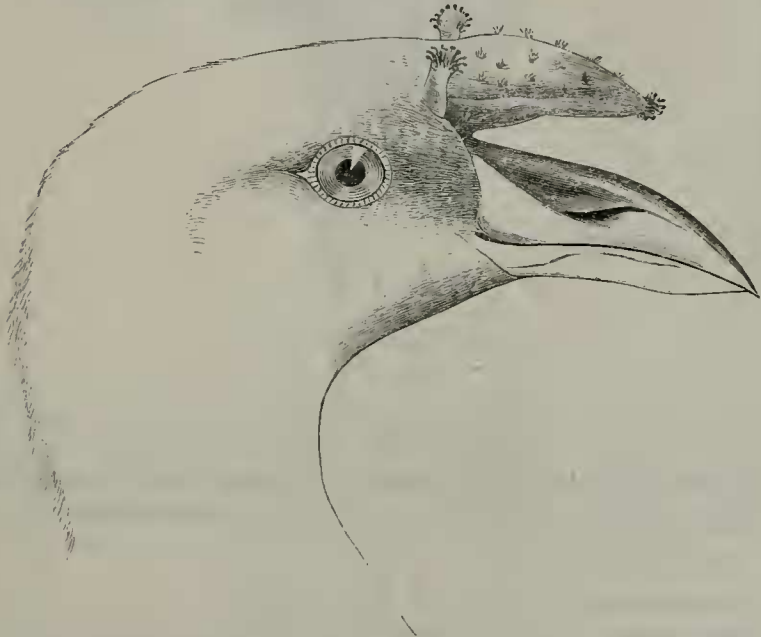
*Lycornis cornuta*, Bp. C. R. xliii. p. 600.

*Cinereo-nigra, capite et cervice obscurioribus: crisso nigro, albicante partim mixto: clypeo frontali caruncula longa eminente instructo: long. tota 19·0, tarsi 3·1.*

*Hab.* Potosi, Bolivia (*Cast. et Dev.*).

*Mus.* Paris.

Fig. 4.

Head of *Fulica cornuta*.

We have seen the only known specimen of this remarkable species in the Paris Museum, but have nothing to add to Dr. Hartlaub's notes on it. The drawing of the head (fig. 4) is from the typical specimen.

2. *FULICA GIGANTEA.*

*Fulica gigantea*, Eyd. & Soul. Voy. Bonite, Zool. p. 102, t. 8; Tsch. F. P. p. 302; Hartl. Cab. J. f. Orn. 1853, Extra-H. p. 80.

*Phalariu gigas*, Reich. Nat. Syst. p. xxi.

*Nigra: crisso albo partim mixto: rostro rubricante: clypeo frontali flavo: pedibus rubris: long. tota 21·0, alæ 10·9, tarsi 3·9, dig. med. cum ungue 5·3.*

*Hab.* Andes of Peru; Altos of Huaihuai (*Tschudi*); between Arequipa and Cusco (*Cast. et Dev.*).

*Mus.* Paris.

Fig. 5.

Head of *Fulica gigantea*.

We have only seen the examples of this scarce species in the Paris Museum, whence our figure of the head (fig. 5) was taken.

### 3. FULICA ARDESIACA:

*Fulica ardesiaca*, Tsch. F. P. *Aves*, p. 303.

*Lysca ardesiacea*, Reich. Nat. Syst. p. xxi.

*Fulica chilensis*, Des Murs in Gay's Faun. Chil. viii. p. 474, Atl. t. 10; Hartl. J. f. Orn. 1853, Extra-H. p. 81; Sclater, P. Z. S. 1860, p. 82; Scl. & Salv. P. Z. S. 1868, p. 177.

*Obscure schistacea, capite undique nigrescente: flexura alari et remigis externi margine albis: crisso nigro lateraliter albo mixto: clypeo frontali tuberositatem parallelogrammicam formante, in tempore nuptiali rubente, aliter albicanti-plumbeo, a rostro linea impressa diviso: pedibus obscure schistaceis: long. tota 16·5, alæ 8·5, caudæ 2·2, rostri a rictu 1·5, tarsi 2·6, dig. med. cum ungue 3·8.*

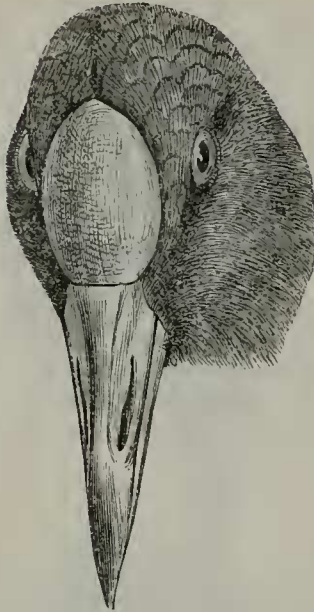
*Hab.* Bolivian Andes (*D'Orb.*); La Paz (*Cast. et Dev.*); Western Peru, Tambo valley (*Whitely*); Andes of Ecuador, between Rionbamba and Mocha (*Fraser*); Western Peru (*Tsch.*).

*Mus.* Brit., S.-G.

Since we wrote our notes on Mr. Whitely's second collection (P. Z. S. 1868, p. 173), we have had, through the kindness of M. Coulon of Neuchâtel, an opportunity of examining the type of



Fig. 6.

Head-shield of *Fulica ardesiaca*.

Tschudi's *F. ardesiaca*. It turns out, as we had anticipated, to be the same as *F. chilensis*, Gay; and the species must therefore be called *F. ardesiaca*, Tschudi's name having the priority. This is quite as well, since, as we have already stated (*l. s. c.* p. 177), it is very doubtful whether this Coot ever occurs in Chili, the only authority for its so doing being Gay's untrustworthy assertion.

#### 4. FULICA ARMILLATA.

*Focha de ligas roxas*, Azara, Apunt. iii. p. 474. no. 448.

*Fulica armillata*, Vieill. N. D. xii. p. 47, et E. M. p. 343; Hartl. Ind. Azar. p. 28 et J. f. O. 1853, Extra-H. p. 82; Burm. Syst. Ueb. iii. p. 390; La Plata-Reise, ii. p. 505.

*Fulica chilensis*, Landb. Wieg. Arch. 1862, p. 221.

*Fulica chilensis*, Sehlegel, Mus. des P.-B. Ralli, p. 63 (?).

*Fulica frontata*, G. R. Gray in Mus. Brit.

*Fulica gallinuloides*, King, Zool. Journ. iv. p. 96 (?).

*Nigricanti-schistacea*, capite toto obscuriore: flexura alari et remigis externi margine albis: crisso albo, plumis quibusdam medialibus albis: rostro flavo maculis basalibus rubris: clypeo frontali magno, ovali, flavo, rubro marginato: pedibus maximis, flavicanti-olivaceis, tibiæ parte ima et tarsi antice ruberrimis: long. tota 16·5, alæ 7·8, caudæ 2·0, rostri a rictu 1·4, tarsi 2·8, dig. med. cum ungue 4·0.

*Hab.* South-east Brazil, St. Catharina (Burm.); Paraguay (Bonpland, Azara); Patagonia (D'Orb.); Chili (Landbeck).

Mus. Brit., Derb.

Fig. 7.

Head-shield of *Fulica armillata*.

Fig. 8.

Head-shield of *Fulica frontata*, G. R. Gray.

This Coot is readily distinguishable among the white-rumped species by its large dimensions, and in particular by the great size of the legs and toes, especially the length of the middle toe, which (taken with that of the nail) usually exceeds four inches. In *Fulica leucopyga* and *F. leucoptera* the corresponding length of the middle toe and tail is barely 3·5. *F. frontata*, Gray, MS., is, as far as we can decide from examination of the single example in the British Museum, merely a specimen of this species with the frontal shield very much developed. Fig. 8 represents the head-shield of this bird.

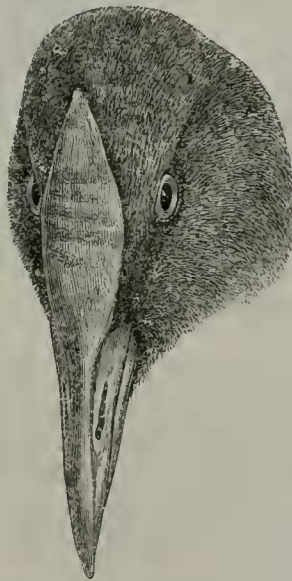
##### 5. FULICA LEUCOPYGA.

*Fulica leucopyga*, Licht. in Mus. Berol.; Hartl. J. f. O. 1853, Extra-H. p. 84; Schlegel, M. des P.-B. *Ralli*, p. 64.

*Fulica rufifrons*, Landbeck, Wieg. Arch. 1862, p. 223.

*Fulica chloropoides*, King, Zool. Journ. iv. p. 95 (?).

Fig. 9.



*Fulica leucopyga.*

*Obscure ardesiaca, capite undique nigricante: crisso albo, plumis quibusdam medialibus nigris: remigis externi margine concolori neque albo: rostri apice flavo, basi cum scuto frontali ruberrimis: hoc angusto, supra acute angulato: pedibus olivaceis: long. tota 16·0, alæ 6·8, caudæ 2·4, rostri a rictu 1·3, tarsi 3·2, dig. med. cum ungue 3·5.*

*Hab.* Uruguay (*Sello*); Chili (*Landb.*); Patagonia (*King*); Falkland Islands (*Mus. Brit.*).

*Mus. Brit.*, *Derb.*

6. *FULICA LEUCOPTERA*.

*Focha*, Azara, Apunt. iii. p. 472; *undè*

*Fulica leucoptera*, Vieill. N. D. xii. p. 48, et E. M. p. 343;  
Hartl. Ind. Azar. p. 28; Burm. La Plata-Reise, iii. p. 505.

*Fulica stricklandi*, Hartl. J. f. O. 1853, Extra-H. p. 86.

*Fulica chloropoides*, Landb. Wieg. Arch. 1862, p. 218.

Fig. 10.

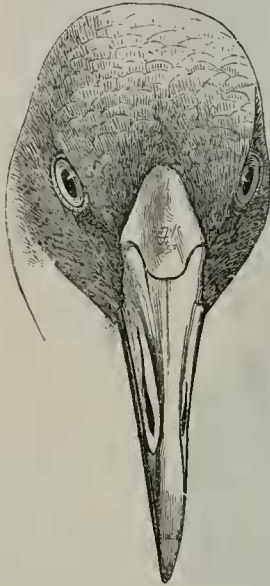
*Fulica americana*.

Fig. 11.

*Fulica leucoptera*.

*Obscure ardesiaca, capite undique nigricante: crisso albo, plumis quibusdam medialibus nigris: flexura alari et remigis externi margine angusto necnon secundariorum quorundam apicibus albis: rostro flavo: clypeo frontali minore, supra rotundato, aurantiaco: pedibus olivaceis: long. tota 15, alæ 7·8, caudæ 2·3, rostri a rictu 1·25, tarsi 2·4, dig. med. cum ungue 3·5.*

*Hab.* Paraguay (*Azara*); Uruguay (*Sello*); Parana (*Burm.*); Chiquitos, Bolivia (*Behn*).

*Mus.* Bremensi.

*Obs.* Haud dissimilis *F. leucopygæ*, sed secundariis albo terminatis, et scuto frontali postice rotundato dignoscenda.

7. *FULICA AMERICANA*.

*Fulica americana*, Gm. S. N. i. p. 704; Baird, Birds N. Am. p. 751; Hartl. J. f. Orn. 1854, Extra-H. p. 87, et 1855, p. 99; Scl. & Salvin, Ibis, 1859, p. 230; Gosse, Birds of Jamaica, p. 304; Léotaud, Ois. Trin. p. 504; Sclater, P. Z. S. 1857, p. 206, et 1859, p. 369; Moore, P. Z. S. 1859, p. 64; Gundlach, Rep. F. N. i. p. 363.

*Obscure cinerea, subtus dilutior; capite undique nigricante: flexura alari, remigis primi margine externo angusto, necnon secundariorum internorum apicibus albis: crisso albo: rostro albicante rubro maculato: scuto frontali parvo, subtriquetro, rubro: pedibus olivaceis: long. tota 12·0, alæ 7·5, caudæ 1·8, rostri a rictu 1·35, tarsi 2·1, dig. med. cum ungue 3·3.*

*Hab.* America bor. universa (*Baird*); Mexico, Jalapa (*Sallé*); Honduras (*Leyland*); Guatemala, Duenas (*Salvin*); Cuba (*Gundlach*); Jamaica (*Gosse*); Trinidad, accidentally (*Léotaud*).

*Mus.* Brit., S.-G.

### Subfam. III. HELIORNITHINÆ.

#### Genus HELIORNIS.

Type.

*Heliornis*, Bonn. Enc. Méth. p. 64 (1790) . . . . . *H. fulica*.

*Podoa*, Ill. Prodr. Syst. p. 267 (1811). . . . . *H. fulica*.

#### HELIORNIS FULICA.

*Le Grèbe-fouque de Cayenne*, Buff. Pl. Enl. 893.

*Colymbus fulica*, Bodd.

*Plotus surinamensis*, Gm. S. N. i. p. 581.

*Podoa surinamensis*, Max. Beitr. iv. p. 823; Cab. in Schomb. Guian. iii. p. 763; Burm. Syst. Ueb. iii. p. 391; Hartl. Ind. Az. p. 28.

*Heliornis fulicarius*, Bonn. Enc. Méth. p. 64.

*Dedales*, Azara, Apunt. iii. p. 468. no. 446.

*Heliornis fulica*, Gray, Gen. B. iii. p. 634; Sel. & Salv. Ibis, 1859, p. 234; P. Z. S. 1864, p. 372, 1866, p. 200, 1867, pp. 754, 979; Léotaud, Ois. de Trin. p. 531; Lawrence, Ann. L. N. Y. vii. p. 302.

*Supra olivaceo-brunneus, capite cum cervice postica et laterali nigris: superciliis, linea cervicis utrinque et corpore subtus albis: crisso nigricante: cauda nigra albo terminata: rostri maxilla nigricante, mandibula flava: pedibus flavis nigro variegatis: long. tota 11·0, alæ 5·2, caudæ 3·3, tarsi 8·5, dig. med. cum ungue 1·45.*

♀. *Mari similis, sed macula magna auriculari utrinque ochraceo-rufa.*

*Hab.* Guatemala (*Salvin*); Panama (*McCleannan*); Cayenne (*Buff.*); Brit. Guiana (*Schomb.*); Eastern Peru, Chyavetas (*Bartlett*), Pebas (*Hauxwell*); South-east Brazil (*Max. et Burm.*); Paraguay (*Azara*).

*Mus.* Brit., S.-G.

*Tabula Rallidarum Americanarum Geographica.*

	North America, Mexico and Central America.	New Granada, Western Ecuador and Peru.	Antilles, Trinidad and Venezuela.	Guiana.	Amazonia.	Bolivia.	South-east Brazil, Paraguay and Ar- gentine Republic.	Chili and Patagonia.	Galapagos Islands.
I. RALLINÆ.									
1. <i>Rallus maculatus</i> .....	..	..	..	..	..	..	..	..	..
2. — <i>elegans</i> .....	*	*	..	..	..	..	..	..	..
3. — <i>longirostris</i> .....	*	..	..	..	..	..	..	..	..
4. — <i>virginianus</i> .....	*	*	..	..	..	..	..	..	..
5. — <i>antarcticus</i> .....	..	..	..	..	..	..	..	..	..
6. — <i>semiplumbeus</i> .....	..	..	..	..	..	..	..	..	..
7. — <i>rythrhynchus</i> .....	..	..	..	..	..	..	..	..	..
8. — <i>nigricans</i> .....	..	..	..	..	..	..	..	..	..
9. <i>Aramides cayennensis</i> .....	..	..	..	..	..	..	..	..	..
10. — <i>albiventris</i> .....	..	*	..	..	..	..	..	..	..
11. — <i>ypecaba</i> .....	..	..	..	..	..	..	..	..	..
12. — <i>ruficollis</i> .....	..	..	..	..	..	..	..	..	..
13. — <i>saracura</i> .....	..	..	..	..	..	..	..	..	..
14. — <i>axillaris</i> .....	..	..	..	..	..	..	..	..	..
15. — <i>mangle</i> .....	..	..	..	..	..	..	..	..	..
16. <i>Porzana carolina</i> .....	*	*	..	..	..	..	..	..	..
17. — <i>albicollis</i> .....	..	..	..	..	..	..	..	..	..
18. — <i>cayanensis</i> .....	..	..	..	..	..	..	..	..	..
19. — <i>levraudi</i> .....	..	..	..	..	..	..	..	..	..
20. — <i>rubra</i> .....	..	*	..	..	..	..	..	..	..
21. — <i>concolor</i> .....	..	*	..	..	..	..	..	..	..
22. — <i>castaneiceps</i> .....	..	..	..	..	..	..	..	..	..
23. — <i>hauxwelli</i> .....	..	..	..	..	..	..	..	..	..
24. — <i>melanophaea</i> .....	..	..	..	..	..	..	..	..	..
25. — <i>albigularis</i> .....	..	*	..	..	..	..	..	..	..
26. — <i>leucopyrrha</i> .....	..	..	..	..	..	..	..	..	..
27. — <i>flaviventris</i> .....	..	..	..	..	..	..	..	..	..
28. — <i>jamaicensis</i> .....	*	*	*	*	*	*	*	*	*
29. — <i>spilonota</i> .....	..	..	..	..	..	..	..	..	..
30. — <i>notata</i> .....	..	..	..	..	..	..	..	..	..
31. — <i>cinerea</i> .....	..	..	..	..	..	..	..	..	..
32. — <i>noveboracensis</i> .....	*	..	..	..	..	..	..	..	..
33. — <i>erythropros</i> .....	..	..	..	*	..	..	..	..	..
34. <i>Crex pratensis</i> .....	*	..	..	..	..	..	..	..	..
35. <i>Thyrorhina schomburgki</i> ..	..	..	..	..	*	*	..	..	..
II. FULCINÆ.									
36. <i>Porphyrio martinicus</i> .....	*	*	..	..	*	*	*	*	*
37. — <i>parvus</i> .....	..	..	..	..	..	..	..	..	..
38. <i>Porphyriops crassirostris</i> ..	..	..	..	..	..	..	..	..	..
39. — <i>melanops</i> .....	..	..	*	*	..	..	..	..	..
40. <i>Gallinula galeata</i> .....	*	*	..	*	*	*	*	*	*
41. <i>Fulica cornuta</i> .....	..	..	..	*	..	..	..	..	..
42. — <i>gigantea</i> .....	..	..	..	..	..	..	..	..	..
43. — <i>ardesiaca</i> .....	..	..	..	*	..	..	..	..	..
44. — <i>armillata</i> .....	..	..	..	..	..	..	..	..	..
45. — <i>leucopyga</i> .....	..	..	..	..	..	..	..	..	..
46. — <i>leucoptera</i> .....	..	..	..	..	..	*	..	..	..
47. — <i>americana</i> .....	*	*	..	..	..	..	..	..	..
III. HELIORNITHINÆ.									
48. <i>Heliornis fulica</i> .....	..	*	..	..	..	..	..	..	..





C Berjeau del et lith

M & N Hanhart sc

OTIS AUSTRALIS ♂



5. Observations concerning the presence and function of the Gular Pouch in *Otis kori* and *Otis australis*. By JAMES MURIE, F.L.S., F.G.S., &c., Prosector to the Society.

(Plate XXXVI.)

*Introductory.*—A remarkable paper appeared in the 'Ibis' \* for 1862,—remarkable alike for the able defence therein sustained of the veracity of the observations of three eminent British naturalists impugned by Dr. Gloger of Berlin, and for the facts substantiating the following curious anomaly. The data given showed that in some male Bustards a large gular pouch had been found, while in other birds of the same species no trace of such a structure or organ existed.

The substance of the above discussion supports the individual statements and opinions of between twenty and thirty trustworthy persons. While thus bearing the impress of science and of facts, it nevertheless, with our more extended present knowledge, savours and reminds one of Merrick's well-known verses upon the varying colour of the Chameleon. All seem to have had truth on their side when viewed in a certain light.

Since the publication of the above elaborate and historical article by Professor Newton, the careful observations of Dr. Cullen (*Ibis*, 1865, p. 143) and of Mr. Flower (*P. Z. S.* 1865, p. 747) have further proved the occasional existence of a large gular sac in the male of *Otis tarda*, Linn., to be a circumstance about which not a shadow of doubt can be entertained.

The subject, however, is one which still calls for more extended examination in other species of the family *Otidæ*. For example, the use which such a curious appendage subserves is still within certain limits a matter of discussion; as it too often happens that organic function, where obscure, puzzles by the apparent multiplicity of uses to which it may be applied.

It has appeared to me, therefore, that the observations which I shall here communicate are not without interest, concerning the function of this little less than wonderful apparatus. The gular-pouch question, though to all intents and purposes amicably settled, is not yet entirely known. Some anomalies thereon are certainly difficult of explanation.

The present communication is mainly based upon the examination of the dead body of a male specimen of Burchell's Bustard (*Otis kori*, Burchell), and upon observations on a living Australian Bustard (*Otis australis*, Gray), both the property of the Society.

*Gular Pouch in O. kori.*—The former bird, a male but not old specimen of *Otis kori*, was forwarded from South Africa, and purchased by the Society May 10th, 1866. Its death occurred in March

\* "On the supposed Gular Pouch of the Male Bustard (*Otis tarda*, Linn.)," by Alfred Newton, M.A., F.L.S. (*The Ibis*, April 1862, pp. 107-127).

1867, when I had the opportunity of ascertaining the presence of a distinct but small-sized gular pouch.

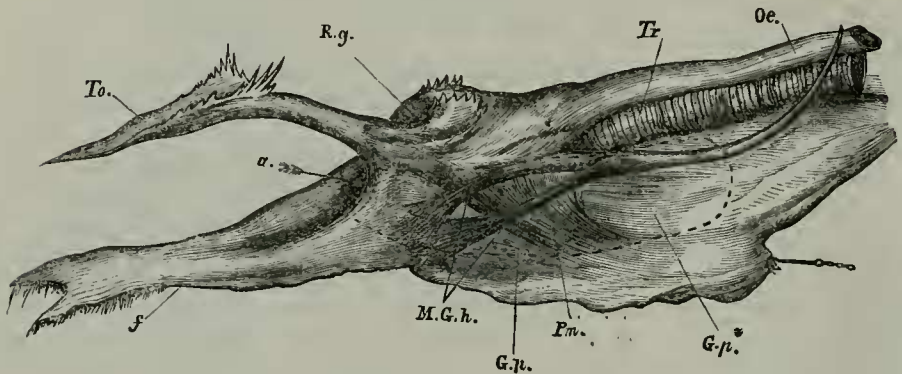
It may not be inappropriate to describe this *in situ*, referring at the same time to the accompanying drawing (fig. 1), as illustrating the appearance and relative position of the parts on their removal from the body.

On examining the mouth when distended, an opening could be seen beneath the tongue, which in size and general relative appearance corresponded very well with the descriptions of the several authors who have found such an entrance into a pouch. It agreed with Mr. Flower's precise anatomical verbal delineation (*loc. cit.* p. 748).

Without any apparent contraction, the aperture above mentioned led into a thin-walled empty sac, which differed from the hitherto recorded cases of gular pouch in *Otis tarda* in being only three inches in length and about an inch in transverse diameter.

In the recent undisturbed state the sac or bag was of nearly equal width above and below, exhibiting no contraction and additional terminal sacculus, as figured and described by Dr. Cullen (*op. cit.* p. 144). Superficially (*i. e.* inferiorly) its walls were in close contact with the delicate skin of the throat; and deeply (*i. e.* superiorly) the sac lay on the trachea (see fig. 1, *infra*).

Fig. 1.



Lateral view showing the position of the gular pouch and surrounding parts in *Otis kori*, the skin and subjacent tissue being thrown back so as to cover it.

*G.p.* *G.p.\** Gular pouch included within the dotted line; *a*, the aperture beneath. *To*, the tongue, which is raised above *f*, floor of mouth. *R.g.* *Rima glottidis*, or laryngeal fissure. *Tr.* Trachea. *Oe.* Oesophagus. *P.m.* The superficial muscular fibres of the *platysma myoides*, or the so-called sphincter of the gular pouch. *M.G.h.* The mylo- and genio-hyoidei muscles, cut through towards their mandibular origin.

The structural elements of this small gular pouch were composed of material very similar to what Mr. Flower mentions, namely, membranous tissue and a minute quantity of elastic fibres interwoven with the areolar tissue. Its lining membrane was apparently a continuation of the mucous coat of the mouth and general faucial aper-

ture, and, like it, of a dark colour. The mucous surface of the floor of the mouth under the tongue and between the rami of the lower mandible had a linear median row of small glandular openings (some dozen in number) in its middle. And laterally, or nearer the mandibular bones, were more numerous irregularly placed minute puncta, likewise the apertures of secreting crypts, *glandulæ sublinguales*. The interior of the gular pouch, however, was free from any such follicles.

The only other point worthy of mentioning, in immediate connexion with the structure of the gular pouch, is the questionable occurrence of a special sphincter muscle for closing its aperture. According to my dissection of the parts which fig. 1 illustrates, the hinder portion of the sac is devoid of any appreciable muscular envelope, and appears only covered by the skin and subcutaneous tissue. In front of this, and situated at what may be considered the neck of the pouch, a delicate layer of somewhat transverse muscular fibres passed across and backwards (see fig. 1, *Pm.*).

This film of muscle doubtless represents an anterior portion of the so-called platysma myoides of Mammalia; or it may be part of the constrictor colli found by Prof. Owen\* in the Apteryx, if not the true platysma, also present in that bird.

*Habits and Inferences.*—Concerning the habits of this specimen of Burchell's Bustard, Mr. Bartlett, our Superintendent, and the keeper, George Misselbrook, who have had more opportunity of watching the bird while alive than I, related to me the following memoranda. That they had never heard it utter any note; that on no occasion had it been seen to inflate or dilate the throat in the manner often witnessed in the common Bustard; that as regards disposition it appeared remarkably quiet and inoffensive, living in perfect harmony with the other birds in the same enclosure.

The points of importance elucidated from dissection and the observations on the living bird resolve themselves into these three:—

1. It would seem that some specimens of Burchell's Bustard (*O. kori*) possess a "gular pouch" identical in position and structure with that of the Great Bustard (*O. tarda*).

2. This sac in the young African male bird in question is very small compared with what other observers have found in the European species of the same genus.

3. The noiseless manner of the bird and want of inflation of this throat-pouch may respectively be dependent on the age or attributed to the absence of sexual desires.

*Pouch in the living O. australis.*—My attention having thus specially been called to the Bustard's curious gular pouch through the examination of the above specimen, I was naturally the more pleased to find what I think may be termed an exaggerated example of this organ in the Australian Bustard.

A male specimen of *Otis australis*, Gray, was received from the Acclimatization Society of Sydney in April 1866. During the same month a second supposed male Australian Bustard was purchased.

\* Trans. Zool. Soc. vol. iii. pp. 278-279.

They were both placed in the paddock along with other specimens of the Bustard tribe.

No particular change was observed in them until the beginning of May 1867, when one began "to show off" as the keeper termed it, and this bird continued to do so at intervals until the end of June, after which it resumed its usual quiet and stately demeanour.

During the current year (1868), about the same time, namely the beginning of May, the same phenomenon has occurred, and this has continued up till the present date (24th June), but is now visibly declining.

This "showing off," which is in truth a most extraordinary sight, may best be comprehended by a study of the accompanying sketch (Plate XXXVI.) drawn from nature during one of those paroxysmal periods of excitement.

The premonitory symptoms observable when the Bustard is about to exhibit himself in the pride of lust (for such it seems to me to be) is a slight swelling of the inframandibular portion of the throat, while the head is thrown upwards. Immediately afterwards the neck swells and the feathers of the lower parts concomitantly bulge out and descend gradually downwards in the form of a bag, oftentimes nearly reaching the ground.

If the paroxysm is a strong one, then the tail is shot upwards and forwards over the back, the rectrices coming almost in contact with the neck.

In this peculiar attitude, with bloated neck, hanging baggy chest, elevated tail, and stiff stilt-like legs, the creature struts about in a somewhat waddling manner, the elongated pouch swaying to and fro. The feathers of the throat start out on end; those of the depending sac are also raised, but less upright. While all this has taken place the bird seems to have gulped in the air, or rather, with partly opened gape, to have taken a long, deep and forced inspiration.

The acme of inspiratory effort and strange attitude attained, the Bustard begins to snap the mandibles together in a loud manner and utter a series of cooing sounds for a short interval of time. Usually, and more frequently, he struts towards the female Bustards in a most dignified manner, or, oblivious as to sex, totters up to any of the birds in the same enclosure.

Occasionally the paroxysm is less marked, and he sits or stands, blowing out in a playful manner the subglobular dilatation under the maxillæ, but not throwing down the pouch or erecting the tail.

This periodical excitement, although lasting altogether about a couple of months, does not continue with vigour the whole of that time. In the beginning of May it is observed at distant intervals, and chiefly the puffing out of the throat occurs. Towards the end of that month the paroxysms take place oftener, and the whole sequelæ of the phenomenon are passed through. By the commencement of June the bird "shows off" very often, and most grandly; before the middle of that month the greatest frequency of the pa-

roxysms has been reached. Each day afterwards they lessen, until as July arrives the Bustard has resumed his usual gentle habits.

The accession of this most remarkable display occurs chiefly early in the morning or at sundown during the period of excitement; and it is only near the climax that it happens during the middle of the day. At such times the fits succeed each other frequently, as often as every hour.

Curiously enough, the companion (*Otis australis*) which arrived in the same month of 1866, and is supposed also to be a male, has never exhibited any such change in its habits.

I should be doing injustice to Prof. Newton's excellent communication did I not specially refer to the circumstance mentioned (*ibid.* p. 114)—that Mr. J. H. Gurney informed him the late Mr. Frederick Strange had published a notice in an Australian newspaper affirming that the *Otis australis* possessed a gular pouch. Mr. Strange, then, is entitled to priority of observation; but as regards his statements concerning the organs in question I am, like Prof. Newton, perfectly ignorant of them.

*Notes on other Bustards.*—Before drawing inferences from the facts which I have first related, I shall allude to an examination of two other species of Bustard made by me. One was a Little Bustard (*Tetrax campestris*), an old male, possessed by the Society, and which died on the 17th September, 1867. No gular pouch was found in this bird. The other, a young male Houbara Bustard (*Otis houbara*, Gm.), examined on the 22nd of the same month, exhibited not a trace of a gular sac.

The peculiar actions and amorous propensities of the Great Bustard (*O. tarda*), noticed almost a century ago, and again and again verified by later writers, and no less skilfully depicted by Wolf (*Zoological Sketches*, vol. i. pl. 45), finds a modified counterpart in *Tetrax campestris* and in *Otis australis*.

*Conclusions.*—The present anatomical examination of the diminutive gular pouch in *Otis kori* cannot of itself in propriety be adduced as evidence of any economical function to which the sac may be applied. The dissection, however, and observations on the living Australian bird, &c., together with the published accounts of others, concerning the presence and functions, or absence of such an organ, have led me to the following reflections:—

1. There is nothing in the structure of the gular pouch, in its position, or in the habits of Bustards, so far as I am informed and can judge, which justifies a belief that its use is that of a water-reservoir. I should therefore incline to Naumann's\* and Yarrell's† opinion rather than that of the original discoverer Dr. Douglas‡ and some later writers.

2. Its nature &c. equally affords grounds for considering that it is not a residual sac for food; the fact of a trifling quantity of

\* *Naturgesch. der Vögel Deutschl.* vii. pp. 20, 21; quoted by Newton, *Ibis*, 1862, p. 115.

† In a letter to Newton, *loc. cit.* p. 118.

‡ *Albin, Nat. Hist. Birds.* iii. p. 36; also quoted by Newton, *l. c.* p. 108.

seeds, grass, or leaves being found in it appears to me only an accidental circumstance, the absence of great muscularity in the walls permitting the foreign body temporarily to lie there. In this respect I also agree with Naumann\* and Yarrell†, although I hardly think that the latter naturalist was right in stating "such foreign substances would destroy the bird by inflammation."

3. What Cullen and other earlier authors (Schneider and Degland‡, for example) have said regarding the presence of the gular pouch during the breeding-season in *Otis tarda*, and what has been observed in the Australian Bustard in our Gardens, show that the pouch is a feature connected with the reproductive function, and only a temporary air-chamber.

The gaudy Peacock swells out with tremulous emotion; the Turkey Cock, the Tragopan, and other birds erect their wattles; the Pouter Pigeon no less shows sexual phenomena akin, though in some respects differing from that of the Bustards.

4. From the statements of various observers, then, it would thus appear that at least five species of Bustard occasionally possess a gular pouch, namely *Otis tarda*, *O. kori*, *O. australis*, *O. nigriceps*, and *O. tetrax*; but others yet unexamined may also have it; so probably it obtains in the family *Otidæ*.

5. In a moderate-aged male Burchell's Bustard, as we have seen, the pouch is very limited in dimensions. In young birds of this and other species it has never been found; and where its existence has distinctly been proved, it invariably (with one apocryphal exception) has occurred in fully grown males. From these data I think it may be inferred that the said "gular pouch" is an organ of adult growth possessed alone by the male, and not attaining its full dimensions until the bird has arrived at maturity. To such circumstances the incidental non-development of the organ may be ascribed.

6. There still remains the unexplained peculiarity that some adult, and possibly it may be *old*, males have it not. This I confess is not at all clear to me. If the organ is reciprocal with the procreative faculty, enlarged or subject to an accession of growth during the instinctive sexual season, then I cannot conceive why traces of the pouch, and especially its opening, do not at all times exist—that is, as soon as the bird has arrived at maturity. That the sac is not the result of a bursting and expansion of the cellular tissue of the throat, as Mr. Bartlett has suggested, I am perfectly satisfied of. In emphysematous disease of the lungs in the higher Mammalia rupture of the pulmonary cells and enlargement into a sacculus does peradventure take place; but in the cellular tissue of the neck of birds we have tissues differently constructed. Moreover the same objection applies in either instance; for in the lung, as would be in the Bustard's neck, such a lesion could not be inflated and com-

\* *Op. cit.*, and *Ibis*, 1862, p. 115.

† *L. c.* p. 118.

‡ See Newton's paper, *L. c.* pp. 107, 115, quotations being there given from the authors; the original volumes it has not been my fortune to consult.

pressed at the will of the bird, as evidently is the case in the organ in question. Besides this, the sac presents a wide external aperture (*i. e.* into the mouth) with natural and healthy-looking walls lined with mucous membrane. As has been demonstrated, the enlarged tracheal pouch of the Emu is not a sudden or accidental circumstance, but the further development of a rudimentary structure found in the young; so in an analogical manner should we expect to find rudiments of the gular pouch in the young male Bustard. If the gular pouch is, so to speak, sporadic, irregularly dispersed among individual specimens, merely the product of inconstant fortuitous circumstances, and produced in old birds in what must seem an incredibly short space of time, then in it we have a most extraordinary physiological fact, and such as does not tally with our present knowledge of the laws of development.

7. Observations respecting the development of this appendage, and especially such as point out the precise period and manner of growth, are yet a desideratum. As I have already hinted in my introductory remarks, some anomalies are certainly difficult of explanation.

8. Finally, with regard to the mechanism of inflation, the first thing is how the air gets there. Now, according to the laws of pneumatics applied physiologically, the pressure of the surrounding atmosphere ordinarily would not be sufficient to overcome the resistance and tonicity of the living tissues, such as to produce complete distention. Neither is it likely that sufflation is the result of a vacuum. A lengthened inspiration may aid, but I believe cannot directly and fully dilate the cavity; that is to say, the tongue being raised and the aperture into the gular pouch unobstructed, the air drawn into the lungs during the inspiratory effort would not equally rush in and fill the gular sac to repletion, as necessarily it does the pulmonary cells and pneumatic cavities. The lungs and subsidiary air-passages once full, however, and expiration naturally taking place, the mouth and posterior nasal passages require only to be partially closed for the thoracic muscular contraction to drive the air into the sac. In other words, muscular power is as requisite to inflate it as to empty it. A familiar illustration might be given in the blowing out of a bladder. Judging from the actions of the living Australian Bustard, the above explanation holds good, inasmuch as previous to expansion of the gular pouch it does not gape, but inspires quietly. When the pouch is blown out and the bird utters the cooing snapping sounds, the mouth is then more or less open. The cooing noise may be laryngeal. If from the gular pouch, compression of the muscular and fibro-elastic tissues of the neck must drive the air out, which, the fibres at the neck of the sac resisting, cause it to escape in jets. By relaxation of the mandibular fibres and contraction of those of the inferior part of the neck, emptiness of the pouch results, and the neck assumes its usual proportions.

6. First Account of Species of Tailless Batrachians added to the Collection of the British Museum. By Dr. A. GÜNTHER, F.R.S., F.Z.S.

(Plates XXXVII., XXXVIII., XXXIX., XL.)

AFTER the arrangement of the collection of Tailless Batrachians had been completed (in 1858), particular attention was paid to the acquisition of such species as were desiderata. A considerable number of specimens were received into the collection, illustrative of the development, sex, variation, and geographical distribution of species hitherto incompletely represented in the collection. It is not my object to refer to these specimens in this paper, but I shall confine myself to an enumeration of those which were entirely wanting in the collection, or which, since the time mentioned, have been described as new.

The number of species contained in the collection at the time of the publication of the 'Catalogue of Batrachia salientia' was 214; this is now increased to 313\*, the number of typical specimens amounting to 125.

I. *List of species acquired which were previously desiderata.*

DACTYLETHRA MUELLERI (Ptrs.). Ten examples from various localities.

RANA FUSCA (Blyth). Tennasserim. Mr. Theobald.

RANA MONTEZUMÆ (Baird). Mexico. Hr. Doorman.

GOMPHOBATES KRÖYERI (Rnhrdt.). —? C. Darwin, Esq.

GOMPHOBATES NOTATUS (Rnhrdt. & Lüt.). Lagoa Santa. Copenhagen Museum.

PYXICEPHALUS EDULIS (Ptrs.). Mozambique. Prof. Peters.

CYSTIGNATHUS MACROGLOSSUS (D. & B.). Montevideo. Purchased.

CRINIA VERRUCOSA (Rnhrdt. & Ltk.). Australia. Earl of Derby.

CRINIA FASCIATA (Steind.). East and West Australia. G. Krefft, Esq.

LIMNODYNASTES DUMERILII (Ptrs.). Adelaide. G. Krefft, Esq.

TARSOPTERUS TRACHYSTOMUS (Rnhrdt. & Lüt.). Lagoa Santa. Copenhagen Museum.

LIOPELMA HOCHSTETTERI (Fitz.). New Zealand. Sir A. Smith.

\* The second richest collection of Tailless Batrachians is in the Paris Museum, which contained 187 species in 1865, according to a statement of Prof. Duméril, *Nouv. Arch. Mus. d'Hist. Nat.* 1865, vol. i. p. 47.





4.



3a



3



1.



1a



2

1 *Cystignathus rhodonotus* 2 *Bufo glaberrimus*.  
3 *Ixalus opisthorhynchus* 4 *Hyla rhodoporus*.





5.

5a



2.



4.



3.



1.



1 *Glyphoglossus molossus*. 2. *Hyla dasynotus*.

3. *Hylodes sallæi*. 4 *Hyla triangulum*.

5. *Cacotus maculatus*





1.



4.

3.



2.

1. *Polypedates cavirostris*. 2. *Polypedates nasutus*.  
3. *Polypedates nanus*. 4. *Ixalus macropus*.



4.



3.



2.



1.

1 *Callula guttulata* 2 *Rappia lagoensis*  
3. *Hyla rubicundula* 4 *Hyla leucostania*





- PHRYNISCUS VARIUS (Stannius). Costa Rica. Prof. Peters.  
 ATELOPUS FLAVESCENS (D. & B.). Chyavetas. Mr. Bartlett.  
 DIPLOPELMA BERDMORII (Blyth). Pegu. Mr. Theobald.  
 BUFO GYMNAUCHEN (Blkr.). Bintang. Dr. Bleeker.  
 PSEUDOBUFO SUBASPER (Blkr.). East-Indian archipelago. Dr. Bleeker.  
 HYLORANA MACULARIA (Blyth). Ceylon and Pegu. Purchased.  
 POLYPEDATES LIVIDUS (? Blyth). Pegu. Mr. Theobald.  
 IXALUS GLANDULOSUS (? Jerdon). Nilgherries. Mr. Theobald.  
 RAPPIA STEINDACHNERI (Bocage). Old Calabar. Purchased.  
 RAPPIA FULVO-VITTATA (Cope). Angola. Dr. Bocage.  
 RAPPIA FUSCIGULA (Bocage). Sierra Leone. J. C. Salmon, Esq.  
 RAPPIA FORNASINII (Bianconi). Twelve examples from various sources.  
 RAPPIA TÆNIATA (Ptrs.). Zambeze. Livingstone expedition.  
 RAPPIA SALINÆ (Bianconi). Zambeze. Livingstone expedition.  
 RAPPIA ARGUS (Ptrs.). Zambeze. Livingstone expedition.  
 RAPPIA INSIGNIS (Bocage). Benguella. Dr. Bocage.  
 RAPPIA MARGINATA (Ptrs.). West Africa. Purchased.  
 HYLAMBATES MARMORATUS (Dum.). Six examples from various sources.  
 PHYLLOBATES ELEGANS†. Bogota. Purchased.  
 HYLODES BOGOTENSIS (Ptrs.). Bogota. Prof. Peters.  
 POHLIA PALMIPES (Steindachner). Pebas. Mr. Hauxwell.  
 HYLA PUNCTATA (Schn.). Bahia and Surinam. Dr. Wucherer.  
 HYLA LEVAILLANTII (D. & B.). Surinam. Hr. Kappler.  
 HYLA CAPISTRATA (Reuss). Brazil. Purchased.  
 HYLA MORELETHI (Dum.). Guatemala. O. Salvin, Esq.  
 HYLA CITROPUS (Péron & Les.). New South Wales. G. Krefft, Esq.  
 HYLA LABIALIS (Ptrs.). Bogota. Purchased.  
 \*HYLA RUBICUNDULA (Rnh. & Ltk.). Brazil. Dr. Gardiner.  
 \*CALLULA GUTTULATA (Blyth). Pegu. Mr. Theobald.

II. *List of the new species acquired from 1859 to 1868.*

- MIXOPHYES FASCIOLATUS. Clarence River. G. Krefft, Esq.  
 DICROGLOSSUS ADOLFI. Himalayas. Messrs. v. Schlagintweit.  
 PYXICEPHALUS RUGOSUS. Pundo Andongo. Dr. Welwitsch.

† An = *Liuperus elegans*, Ptrs.?

*RANA LIEBIGII*. Nepal, Sikkim. B. H. Hodgson, Esq., and Messrs. v. Schlagintweit.

*CYSTIGNATHUS ALBILABRIS*. St. Thomas. Hr. Riise.

\**CYSTIGNATHUS RHODONOTUS*. Chyavetas. Mr. Bartlett.

*CRINIA TASMANIENSIS*. Van Diemen's Land. Purchased.

*CRINIA LÆVIS*. Van Diemen's Land. Mr. Milligan.

*CRINIA AFFINIS*. West Australia. Hr. Dämel.

*PLATYPLECTRUM MARMORATUM*. Clarence River. G. Krefft, Esq.

*LIMNODYNASTES PLATYCEPHALUS*. Adelaide. G. Krefft, Esq.

*LIMNODYNASTES KREFFTII*. Sixteen examples from various sources.

*LIMNODYNASTES AFFINIS*. Clarence River. G. Krefft, Esq.

*CHIROLEPTES ALBOGUTTATUS*. North Australia. Hr. Dämel.

*CRYPTOTIS BREVIS*. Clarence River. G. Krefft, Esq.

*XENOPHRYS MONTICOLA*. Himalayas and Pegu. Three examples.

\**NANNOPHRYS CEYLONENSIS*. Ceylon. Mr. Higgins.

\**CACOTUS MACULATUS*. Chili. Purchased.

\**GLYPHOGLOSSUS MOLOSSUS*. Pegu. Mr. Theobald.

*CACOPUS GLOBULOSUS*. Russelconda. Dr. Trail.

\**BUFO GLABERRIMUS*. Bogota. Purchased.

*BUFO CÆRULEOSTICTUS*. West Ecnador. Mr. Fraser.

*BUFO GALEATUS*. Gamboja. M. Mouhot.

*HYLORANA TEMPORALIS*. Ceylon. Purchased.

*IXALUS FEMORALIS*. Ceylon. Purchased.

*IXALUS TEMPORALIS*. Ceylon. Purchased.

\**IXALUS MACROPUS*. Ceylon. Purchased.

\**IXALUS NASUTUS*. Ceylon. Purchased.

\**IXALUS OPISTHORHODUS*. Nilgherries. Mr. Theobald.

\**MEGALIXALUS INFRARUFUS*. —? Dr. Günther.

\**POLYPEDATES NANUS*. South Ceylon. Purchased.

*POLYPEDATES PLEUROSTICTUS*. Madras. Zoological Society.

*POLYPEDATES RETICULATUS*. Ceylon. Purchased.

\**POLYPEDATES NASUTUS*. Ceylon. Purchased.

\**POLYPEDATES CAVIROSTRIS*. Ceylon. Purchased.

\**POLYPEDATES RUFESCENS*. West Africa. Purchased.

*RAPPIA RETICULATA*. —?

\**RAPPIA LAGOENSIS*. Lagos. H. T. Ussher, Esq.

*RAPPIA CITRINA*. Senegal and Zambeze. Messrs. Whitfield and Livingstone.

*RAPPIA FLAVOMACULATA*. Rovuma Bay. Livingstone expedition.

*RAPPIA MICRIPS*. Zambeze. Livingstone expedition.

*RAPPIA NASUTA*. Angola. Dr. Bocage.

\**HYLAMBATES VIRIDIS*. West Africa. Purchased.

*HYLODES UNISTRIGATUS*. West Ecuador and Bolivia. Mr. Fraser.

\**HYLODES SALLÆI*. Central America. Messrs. Sallé and Salvin.

*PLATYMANTIS PLATYDACTYLA*. Polynesia. 'Voyage of the Herald.'

*LITORIA WILCOXII*. Ten examples from various parts of East Australia.

*LITORIA LATOPALMATA*. Port Denison. G. Krefft, Esq.

*HYLA INFRAFRENATA*. Cape York. Hr. Dämel.

*HYLA NIGROFRENATA*. Cape York. Hr. Dämel.

*HYLA PHYLLOCHROA*. Sydney and Erumanga. Purchased.

*HYLA KREFFTII*. Nine examples from various parts of East Australia.

\**HYLA DASYNOTUS*. Brazil. Dr. A. Günther.

\**HYLA TRIANGULUM*. Brazil. Dr. A. Günther.

\**HYLA RHODOPORUS*. Upper Amazons. Mr. Bartlett.

\**HYLA LEUCOTÆNIA*. Rio Grande. Purchased.

*CALLULA OBSCURA*. Ceylon and Nilgherries. Sir A. Smith and Mr. Theobald.

Most of the species forming the second list have been already described in the 'Proceedings' of this Society, the Ann. & Mag. Nat. Hist., or the 'Reptiles of British India.' I subjoin descriptions of and remarks upon those marked with an asterisk (\*).

*CYSTIGNATHUS RHODONOTUS*. (Plate XXXVII. fig. 1.)

This species is allied to *Cystignathus nodosus*, having likewise the subarticular enlargements on the fingers and particularly on the toes much developed and pointed. Rather stout in habit. Head broad; cleft of the mouth very much broader than long; snout obtusely rounded, a little longer than the eye, with the canthus rostralis obtuse. Tympanum very distinct, half as large as the eye. Vomerine teeth in two slightly arched series, the lateral portion of which is situated behind the choanæ. Limbs rather short; first finger considerably longer than second, but a little shorter than third. The length of the body is rather more than the distance of the vent from the two small metatarsal tubercles. The fourth toe half as long as the body; third toe a little longer than fifth.

Brown: a broad rose-coloured band occupies the whole back from

the nostril to the sacrum. Limbs with brownish-black cross bands; the interspaces tinged with pink. Lower parts greyish, with numerous small white specks.

Mr. E. Bartlett found a single specimen of this species at Chyvetas, Eastern Peru. It is 40 millims. long, hind limb 58, fourth toe 19 millims.

#### NANNOPHRYS, g. n. ASTEROPHRYS.

Fingers and toes tapering, free to the base; lower jaw with a pair of very slightly prominent apophyses in front and with a pointed symphyseal tubercle; the internal openings of the nostrils and eustachian tubes small; tympanum of moderate size, distinct. No parotoids. The transverse processes of the sacral vertebra dilated into a flat triangle. Vomer with two very inconspicuous prominences on which no teeth can be distinguished. Tongue deeply forked behind. Upper eyelid flaccid, without prominent edge.

#### NANNOPHRYS CEYLONENSIS.

Similar in habit to a young *Rana kuhlii*. Head broad, depressed, short, the snout being as long as the diameter of the eye: canthus rostralis distinct; loreal region sloping; nostril close to the end of the snout. Eye of moderate size, prominent. Tympanum half as large as the eye. A lineal fold runs from the hinder edge of the orbit, over the tympanum, towards the arm-pit. Cleft of the mouth broader than long; tongue rather narrow. The vomerine prominences are situated on a level with the hinder edge of the choanæ. Skin slightly tubercular; an indistinct fold across the crown of the head from one hinder angle of the orbit to the other. Limbs of moderate length, the length of the body being rather more than the distance of the vent from the heel. The third finger rather longer than the fourth, which is scarcely longer than the second. Metatarsus with one inconspicuous tubercle. The fourth toe is not quite half as long as the body; the third is a little longer than the fifth.

Upper parts brown, marbled with darker; limbs with dark cross bands. Upper lip with some small white spots; a pair of white spots below the vent. Lower parts whitish.

I have examined four examples from Ceylon, probably from the southern parts. They are 25 millims. long, the hind limb being 37 millims.; but I have reason to believe that the species grows to a larger size.

#### CACOTUS, g. n. BOMBINATORIN.

Fingers and toes tapering. Maxillary and vomerine teeth distinct. Tongue broad, slightly notched behind. Toes quite free; metatarsus with two tubercles. Tympanum absent; eustachian tubes reduced to a minute foramen. Transverse processes of sacral vertebra not dilated.

#### CACOTUS MACULATUS. (Plate XXXVIII. fig. 5.)

Similar in habit to *Pleurodema bibronii*. Head of moderate width.

Snout rather short, scarcely longer than the diameter of the eye; canthus rostralis rather obtuse, with the loreal region sloping. The slight vomerine prominences form two short transverse prominences between the choanæ, which are very small. Skin nearly smooth or with very small flat smooth tubercles. The length of the body equals the distance between the vent and the metatarsal tubercles. Sub-articular tubercles on the fingers and toes well developed; metatarsus with two tubercles. Length of the fourth toe two-fifths of that of the body; third and fifth toes equal in length.

Greenish olive above, marbled with brownish and sometimes with minute pink dots; an obsolete dark band across the forehead from one eye to the other, a black band along the canthus rostralis and from the eye to the arm-pit. Limbs with black cross bands. Throat and abdomen whitish, marbled with blackish.

I have examined two specimens purchased of Mr. Stevens, who states that they came from Chile. They are 33 millims. long, the hind limb being 48, and the fourth toe 14 millims. long.

#### GLYPHOGLOSSUS, g. n. RHINODERMAT.

This genus is closely allied to *Cacopus*, which it also greatly resembles in general appearance, differing, however, in the shape of the tongue and in the structure of the vomer.

Head very short, crown convex; mouth transverse, very narrow; limbs short; eye small. The space between and behind the inner nostrils is even, without papillæ; one papilla in the median line of the hinder part of the palate. Tongue long, free, and notched behind and in front, divided into two lateral halves by a deep groove. Tympanum hidden; openings of the eustachian tubes small. Toes broadly webbed; metatarsus with a large, compressed, cutting, shovel-like prominence.

#### GLYPHOGLOSSUS MOLOSSUS. (Plate XXXVIII. fig. 1.)

Snout very short, without canthus rostralis. The fleshy part of the lower jaw is swollen, truncated in front, forming a semicircular disk. The whole snout is covered by a leathery finely granular skin. Body short and thick; limbs very short; skin in the loins broad and loose. Pupil of the eye vertical. Skin smooth. There is another, very small tubercle behind the large one on the metatarsus. The web between the toes extends to their extremities. Uniform brownish olive above, sides and limbs finely marbled with brown, lower parts whitish.

A single specimen, 50 millims. long, has been obtained by Mr. Theobald in Pegu.

#### BUFO GLABERRIMUS. (Plate XXXVII. fig. 2.)

Body perfectly smooth, with very few slight tubercles on the side. Crown of the head flat, without ridges. Parotoid very distinct, ovate, its length being equal to its distance from that on the other side. Snout angular, the canthus rostralis being distinct. The

diameter of the eye equals the length of the snout. Edge of the upper eyelid very sharp. Tympanum distinct, one-third of the size of the eye. Mouth broader than long. Limbs moderately developed; first finger longer than the second, and as long as the fourth. The length of the body equals the distance between the vent and the metatarsal tubercle. Toes nearly half webbed; metatarsus with one tubercle; tarsus without longitudinal fold.

Upper parts brownish black; the sides black. Lower parts blackish, with white dots. A beautiful rose-coloured spot in the groin; smaller spots of the same colour on the hinder part of the thigh.

We have received a single example from Bogota; it is 45 millims. long, the fore limb measuring 30, the hind limb 60, and the fourth toe (from the metatarsal tubercle) 18 millims.

#### *IXALUS MACROPUS.* (Plate XXXIX. fig. 4.)

Snout as long as the eye, not obtuse in front, with angular canthus rostralis. Tympanum small, inconspicuous. Skin of the upper parts with a few small scattered tubercles and some short oblique glandular folds. The length of the body is somewhat less than the distance between vent and heel. No fold of the skin along the tarsus; metatarsus with a single tubercle; the interdigital web extends to the outer phalanx of the third and fifth toes; disks of the fingers and toes moderately broad. Upper parts brown, marbled with darker; a dark band from eye to eye, limbs with dark cross bands; hinder part of the thigh brown, lower parts white, a few spots across the chest.

We have received one example from Southern Ceylon; it is 37 millims. long, the hind limb being 67 millims.

#### *IXALUS NASUTUS.*

Snout pointed, rather longer than the eye, with angular canthus rostralis. Tympanum rather small, inconspicuous, skin of the upper parts with very small scattered tubercles. The length of the body equals the distance between vent and heel. No fold of the skin along the tarsus; metatarsus with a single tubercle; web between the toes rudimentary; digital disks moderately developed. Upper parts grey clouded with darker, loreal region darker; a blackish band above the tympanum. Throat brown, abdomen with brown spots. A very fine white line runs from the tip of the nose, along the median line of the back, to the vent.

A single specimen has been received from Ceylon; it is 18 millims. long, the hind limb being 23 millims. In spite of its diminutive size, the specimen, which is a male, appears to be adult.

#### *IXALUS OPISTHORHODUS.* (Plate XXXVII. fig. 3.)

Snout longer than the eye, rather pointed in front, with angular canthus rostralis. Tympanum hidden by the skin. Skin of the upper parts smooth, with a few short oblique glandular folds. The length of the body is a little more than the distance between the vent and heel. No fold of the skin along the tarsus; metatarsus

with a single tubercle; the interdigital web is rather deeply emarginate, scarcely extending to the outer phalanx of the third and fifth toes; disks of the fingers and toes small. Brownish olive above, indistinctly clouded with darker; limbs with brown cross bands; a black transverse triangular spot across the anal region. Throat and fore part of abdomen dotted with brown; hinder part of abdomen and lower side of leg beautifully rose-coloured.

A single example from the Nilgherries has been presented to the British Museum by Mr. Theobald; it is 25 millims. long, the hind limb being 36 millims.

#### MEGALIXALUS, g. n. POLYPEDATID.

Vomerine teeth none. Fingers and toes webbed; none of the fingers opposed to the others. Tympanum small; eustachian tubes and inner nostrils of moderate width; tongue free and deeply notched behind. Pupil of the eye vertical. Apophyses of the sacral vertebra styliiform. Three phalanges of the fifth toe free from the fourth.

#### MEGALIXALUS INFRARUFUS.

Head large, broad, depressed, snout longer than the eye, with the canthus rostralis angular, and the loreal region flat, sloping. Eye large, upper eyelid free and notched behind. Tympanum extremely small. Disks of the fingers and toes well developed; outer fingers half-webbed; toes three-fourths webbed. Skin entirely smooth. Upper parts uniform green, lower rufous. Lips and upper eyelids with a white margin.

The origin of the specimen is not known; it is 65 millims. long, the length of the hind limb being 96 millims.

#### POLYPEDATES NANUS. (Plate XXXIX. fig. 3.)

Similar in habit to *Polypedates maculatus*. Head broad, snout short, canthus rostralis angular, loreal region flattish. Eye large, tympanum very small and indistinct. The vomerine teeth stand in two oblique series between the choanæ; in young examples (25 millims.), the teeth as well as the tooth-bearing ridges are absent; and these specimens may easily be mistaken for *Ixalus*. Upper parts with rather numerous very small tubercles; the tubercular ridge between the eyes is crossed by a very fine longitudinal glandular fold running from the nose to the occiput. Young specimens nearly entirely smooth, limbs rather slender, the length of the body being equal to the distance between vent and heel. Disks large, fingers not webbed; second finger much shorter than the fourth, which is a little shorter than the third. Toes one-third webbed; third toe shorter than fifth. Tarsus without fold, metatarsus with a very small tubercle. Brownish or greyish olive, with symmetrical dark markings on the back; sides and hind part of the thighs with brown spots; limbs with brown cross bands. Lower parts whitish, throat with small brown spots.

We have received three examples from Southern Ceylon; the  
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largest is only 35 millims. long, the length of the hind limb being 60 millims.

*POLYPEDATES NASUTUS.* (Plate XXXIX. fig. 2.)

This species will be readily recognized by its extremely prolonged and pointed snout, which is as long as the width between the anterior angles of the orbit; in other respects it is similar to *Polypedates eques*. The nose projects far beyond the mouth; canthus rostralis angular, loreal region grooved, eye large, tympanum more than half as large as the eye. A narrow glandular fold runs from the back edge of the eye, above the tympanum, to the shoulder; upper parts and throat quite smooth; abdomen finely granular; lower side of the thigh with large white tubercles, those in a series below the anu; being largest. Fingers not webbed; disks of fingers broad, of toes moderate; second finger much shorter than fourth, which is nearly as long as the third. The membrane between the toes reaches to half the length of the fourth, and does not extend to the disks of the four others. The third and fifth toes are nearly equal in length; at the base of the first is a small tubercle. Heel with a skinny spur-like appendage. Above greenish olive, with darker bands across the limbs; sides of the head and body blackish, with a yellow band commencing on the tip of the nose, narrower before the eye and broader behind it; lower parts nearly uniform yellow, with a black edge round the lower jaw. Vent black.

We have received a single female specimen from Southern Ceylon; it is 60 millims. long, the length of hind limb being 95 millims.

*POLYPEDATES CAVIROSTRIS.* (Plate XXXIX. fig. 1.)

Similar in habit to *Polypedates reticulatus*. Head large and broad, snout short, canthus rostralis angular and arched, loreal region deeply concave. Eye of moderate size; tympanum distinct, ovate, one-third the width of the eye. Limbs of moderate length, the length of the body being equal to the distance between vent and heel. Fingers scarcely webbed, disks moderately developed; toes broadly webbed, the interdigital membrane extending to the disks of the third and fifth toes. A small moveable tubercle at the base of the first toe. Heel without spur, but the hind margin of the tarsus is fringed; a patch of pointed tubercles below the vent. Upper parts with very minute tubercles or granules symmetrically arranged; vomerine teeth on a very short prominence, situated at the inner anterior angles of the choanæ. Upper parts reddish olive, finely marbled with black on the sides and caudal region. Lower parts whitish, throat speckled with brown. Limbs with a few indistinct dark cross bands; *the hinder side of the thighs is not coloured.*

We have received one example from Southern Ceylon; it is 45 millims. long, the length of the hind limb being 77 millims.

*POLYPEDATES RUFESCENS.*

Fingers broadly webbed, the web between the two outer fingers



extending to the terminal disk; toes completely webbed, the web leaving only the disks free. Vomerine teeth in two short oblique series commencing from the anterior angles of the choanæ. Snout of moderate length, nearly as long as the eye, with the canthus rostralis obtuse. Tympanum distinct, half as large as the eye; upper parts of the head and sides of the body with very small tubercles. The length of the body is more than the distance between vent and heel. Upper parts brownish. A dark cross band between the eyes. Lower parts whitish.

A single specimen, 55 millims. long, was in a collection from West Africa; the length of the hind limb is 85 millims.

*RAPPIA LAGOENSIS.* (Plate XL. fig. 2.)

Similar in habit to *R. marmorata*. Head broad, snout short, tongue heart-shaped, tympanum hidden, the two outer fingers half, the toes three-fourths webbed. Smooth above, granulated below, Yellowish olive, coarsely reticulated with black above; a deep-black streak along the canthus rostralis. Exposed parts of the upper surface of the limbs irregularly spotted with black. Lower parts uniform whitish.

We have received two examples, one from a dealer, the other from H. T. Ussher, Esq., who found it at Lagos.

Length of the body 28 millims., of hind limb 49 millims.

*HYLAMBATES VIRIDIS.*

Uniform green above, white below, a few small brown spots on the sides; upper lip and hind part of the limbs with a white margin. Vomerine teeth in two small patches between the nostrils; tongue deeply notched behind; snout rather obtuse, depressed. Tympanum distinct, half as long as the eye. Disks well developed, fingers slightly webbed, toes one-third webbed, metatarsus with one rather large tubercle. Fourth finger considerably longer than second; fifth toe longer than third.

We have received one specimen; it is 42 millims. long, the length of the hind limb being 60 millims.

*HYLODES SALLÆI.* (Plate XXXVIII. fig. 3.)

Similar in habit to a young *Rana temporaria*. Snout of moderate length, somewhat pointed; canthus rostralis angular, loreal region subvertical, flattish. Eyes of moderate size, one-third larger than the tympanum. Tongue ovate, much narrower than the mouth, very slightly notched behind. The vomerine prominences are short and small, situated behind the choanæ; choanæ and eustachian tubes small. Skin smooth, with several exceedingly fine linear glandular folds—one from the eye above the tympanum to the shoulder, another from the eye to the centre of the back, and one or two on each side of the hinder part of the back. Lower parts nearly entirely smooth. The second and fourth fingers nearly equal in length, shorter than the third. The length of the body is

a little more than the distance between the vent and heel. The third and fifth toes equal in length; metatarsus with two small tubercles, tarsus without fold. Greyish olive, a black band runs from the nostril through the eye to behind the tympanum; an indistinct blackish band between the eyes; anal region blackish, sometimes a black spot in the centre of the back.

We possess two specimens, of nearly the same size—one received from Mexico through M. Sallé, and the other from Mr. Salvin's Vera-Paz collection. Length of body 28 millims., of hind limb 46 millims., of fourth toe (from metatarsus) 13 millims.

*HYLA DASYNOTUS.* (Plate XXXVIII. fig. 2.)

Habit slender; snout very short, depressed, obtuse in front, without canthus rostralis; loreal region concave. Vomerine teeth in two small groups between the inner nostrils, which are small. Tongue slightly notched behind, with a median groove. Eye large, prominent. Tympanum very small, indistinct. Disks moderately developed; fingers half webbed; toes nearly entirely webbed. A narrow white fringe along the forearm, and along the tarsus. The skin from the occiput along the spine to the sacral vertebra is immoveable and covered with warty excrescences; otherwise the head and body are smooth. The length of the body is rather more than the distance of the vent from the metatarsus. Brownish above, the warty parts of a darker colour; sides of the abdomen marbled with black and white. A black streak along the canthus rostralis and above the tympanum, a black spot anteriorly below the eye; a dark cross band between the eyes. Femur deep black, with white ovate spots or cross bars; fore limbs and lower legs with brown cross bands. Lower parts whitish, throat and especially gular sacs brown.

One male specimen, with a pair of large gular sacs, from Brazil; it is 32 millims. long, the hind limb being 44 millims.

*HYLA RHODOPORUS.* (Plate XXXVII. fig. 4.)

This species belongs to that group in which the vomerine teeth are placed in two curved series, forming together an arch with the convexity towards the front; however, the series are less distinctly curved than in the other species, this species being less developed in size than its natural allies. It is very closely allied to *H. albomarginata* or *H. infulata*. The snout is much depressed, with the canthus rostralis very obtuse, and the loreal region concave. Eye of moderate size, shorter than the snout. Choanæ wide. Tongue scarcely notched behind; tympanum two-thirds the size of the eye. Fingers very slightly webbed; toes two-thirds webbed. The length of the body equals the distance between vent and heel, and is thrice the length of the foot. Skin smooth, with numerous minute pores on the upper parts. Light olive-coloured, each pore with a minute rose-coloured dot; the dots confluent into spots on the eyelids; no band along the canthus rostralis or on the legs, the exposed parts of which are coloured like the back. Uniform whitish below.

One specimen was found by Mr. Bartlett on the Upper Amazons ; it is 38 millims. long, the length of the hind limb being 60 millims. Another example, from Surinam, appears to belong to the same species.

*HYLA TRIANGULUM.* (Plate XXXVIII. fig. 4.)

Similar in habit to *H. arborea*. Snout short, as long as the diameter of the eye, which is of moderate size. Canthus rostralis angular, loreal region flat. Vomerine teeth in two short groups between the choanæ, which are small. Tympanum hidden, pharyngeal tubes very narrow. Disks moderately developed ; fingers half webbed ; toes three-fourths webbed. Length of the body rather more than the distance between vent and heel. Back and exposed parts of the limbs brownish grey ; a triangular isosceles deep-black spot, edged with white, on the head and nape, one angle being on each eyelid, and the third behind the nape. Side of the head and body brown, lower parts whitish.

One specimen, 27 millims. long, probably from Brazil ; hind limb 42 millims.

*HYLA RUBICUNDULA.* (Plate XL. fig. 3.)

*Hyla rubicundula*, Rnhrdt. & Lütke. Vid. Medd. nat. Foren. Kjöbenh. 1862, p. 197 ; Hensel, Wieg. Arch. 1867, p. 158.

Slender ; snout moderately obtuse, with angular canthus rostralis, and with the loreal region subvertical. Eye of moderate size, nearly as long as the snout ; tympanum very small, distinct. Vomerine teeth in two small groups, situated immediately behind the level of the narrow choanæ. Tongue not notched. Vocal sac of the male extending to the sternum. Upper parts smooth. Fingers slightly but distinctly webbed ; toes half webbed. Disks of fingers and toes rather small. The length of the body is rather more than the distance between vent and heel. Light olive, with numerous parallel brown longitudinal bands on the body and limbs ; these bands proceed from the snout, are unequal in width, and more or less distinctly edged with white ; the broader of the bands are sometimes broken up in series of ovate spots. A blackish band, edged with white above and below, and longitudinally traversed by another white band, from the nostril to the loin.

Southern parts of Brazil.

*HYLA LEUCOTÆNIA.* (Plate XL. fig. 4.)

Moderately slender ; snout rather obtuse, with angular canthus rostralis, and with the loreal region subvertical. Eye of moderate size, not quite so long as snout ; tympanum very small, not very distinct. Vomerine teeth in two small groups, on a level with the hinder edge of the narrow choanæ. Tongue not notched. Male with a large vocal sac, extending backwards to the sternal region. Upper parts smooth. Fingers free, toes half webbed ; disks of fingers and toes rather small. The length of the body is rather

more than the distance between vent and heel. Light olive, a *white* inferiorly greyish line runs along the canthus rostralis and upper part of the side of the body. Lower leg with a whitish outer margin.

A male specimen from Rio Grande, 38 millims. long; hind limb 60 millims.

Distinguished from *H. rubicundula* by the white lateral line and sloping loreal region.

CALLULA GUTTULATA. (Plate XL. fig. 1.)

*Megalophrys guttulata* (Blyth).

Snout very short, depressed, and obtusely rounded. Skin entirely smooth, without any tubercles. Limbs short, the length of the body being a little more than the distance of the vent from the metatarsal shovel. None of the toes are dilated into disks; hind toes one-fourth webbed; fingers rather long; metatarsus with a flat, compressed, sharpish tubercle or shovel.

The eye is small, not longer than the snout; a very prominent osseous ridge across the vomer behind the choanæ, interrupted in the middle. Tympanum hidden.

This species is most beautifully coloured, the ground-colour of the upper parts being a pink or yellowish olive, coarsely marbled with brown, the brown marks being edged by a black line. A long transverse black mark across the vent and hinder surface of thighs. Lower parts uniform yellowish.

Several specimens were collected by Mr. Theobald in Pegu. The largest is 50 millims. long; hind limb 63 millims.

EXPLANATION OF PLATES XXXVII., XXXVIII., XXXIX., XL.

PLATE XXXVII.

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| Fig. 1. <i>Cystignathus rhodomotus</i> , p. 481. | Fig. 3. <i>Ixalus opisthorrhodus</i> , p. 484. |
| 2. <i>Bufo glaberrimus</i> , p. 483.             | 4. <i>Hyla rhodoporus</i> , p. 488.            |

PLATE XXXVIII.

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| Fig. 1. <i>Glyphoglossus molossus</i> , p. 483. | Fig. 4. <i>Hyla triangulum</i> , p. 489. |
| 2. <i>Hyla dusymotus</i> , 488.                 | 5. <i>Cucotus maculatus</i> , p. 482.    |
| 3. <i>Hylodes sallee</i> , p. 487.              |  |

PLATE XXXIX.

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| Fig. 1. <i>Polypedates cavirostris</i> , p. 486. | Fig. 3. <i>Polypedates nanus</i> , p. 485. |
| 2. <i>Polypedates nasutus</i> , p. 486.          | 4. <i>Ixalus macropus</i> , p. 484.        |

PLATE XL.

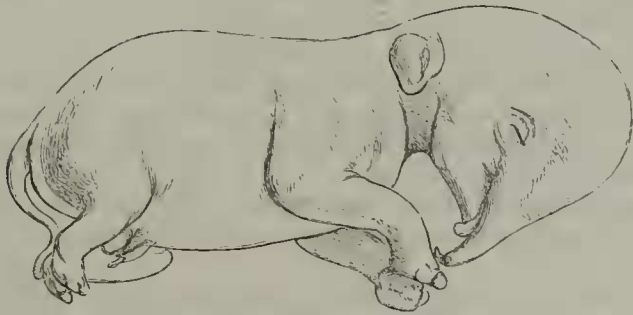
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|--|---|
| Fig. 1. <i>Callula guttulata</i> , p. 490. | Fig. 3. <i>Hyla rubicundula</i> , p. 489. |
| 2. <i>Rappia lagoensis</i> , p. 487.       | 4. <i>Hyla leucotenis</i> , p. 489.       |

7. Notes on the Fœtus of an Elephant and of a Hippopotamus in the Collection of the British Museum. By Dr. J. E. GRAY, F.R.S., V.P.Z.S., &c.

Among the specimens of animals in spirits that were in the British Museum when I was in the habit of studying in that establishment, now more than fifty years since, are the fœtuses of two large animals—the one that of an Indian Elephant, and the other of a Hippopotamus. They are remarkable, first, for their very small size, compared with the size of the adult animal, and, secondly, for the different parts of the animal being so much more nearly of the proportions of those of the adult than they generally are in fœtuses of such a small size. These specimens have attracted considerable public attention; and every now and then persons who have seen them many years ago are bringing visitors to see what they consider one of the most interesting curiosities in the Museum, viz. “an Elephant in a half-pint bottle.”

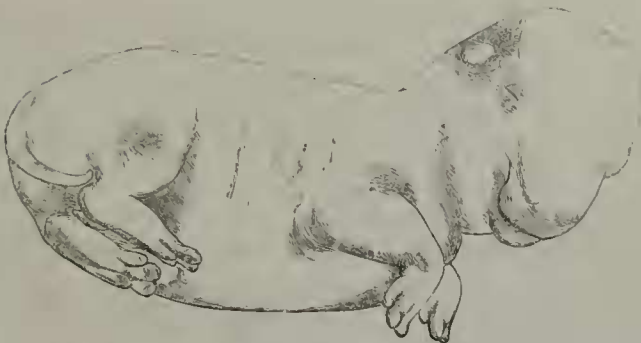
It has occurred to me that it would be interesting to have these figured, of their natural size, by the accurate pencil of Mr. Ford.

Fig. 1.



Fœtus of Indian Elephant.

Fig. 2.



Fœtus of Hippopotamus.

Mr. Flower informs me that in the Museum of the College of Surgeons there are several fœtuses of Indian Elephants; the smallest is about double the size of the one here figured. In the same collection is the fœtus of a *Rhinoceros oswellii* of Africa, presented by Messrs. Chapman and Bains, about 6 inches long.

8. Notes on the Skulls of the Species of Dogs, Wolves, and Foxes (*Canidæ*) in the Collection of the British Museum.  
By Dr. J. E. GRAY, F.R.S., V.P.Z.S., F.L.S., &c.

The Dogs form a very natural group; and it was early divided by the community and naturalists into Dogs and Foxes, according to the length of the tail and the sharpness of the face. More lately, as more or less anomalous species have been discovered, as the Hyæna-like Dog of Africa, the Raccoon Dog of China and Japan, the Weasel-like Dog of Brazil, they and some other species have been separated into genera.

The Canidæ have been separated by general consent into three natural groups, according to the length and form of the tail,—the *Wolves* having a short and straight tail, the *Dogs* a more or less elongated tail bent to the left and more or less curled, the *Foxes* an elongated bushy tail. In South America there is found a group with skulls like Wolves but with long slender tail, which may be called long-tailed Wolves. There is no doubt that the form of the tail affords very permanent characters and has considerable influence on the habits of the animal.

Dr. Burmeister has studied the skulls of the group; and he divides the family, according to the form of the postorbital process, into two tribes, thus:—

I. LUPINÆ. Postorbital process of the frontal bone very convex, and curved downwards, without any depression in the upper surface. To this group he refers *Canis* with a short, *Lycalopex* and *Pseudalopex* with an elongated tail. The skull in this group is generally thick and solid.

II. VULPINÆ. Postorbital process of the frontal bone spread out, bent a little forward, the front edge turned up, with a longitudinal shallow pit or indentation on the upper surface at the base. This division includes the genera *Fulpes* and *Urocyon*. The skulls of this section are elongated, slender, thin, and light. The habit of the animal is generally nocturnal, and the pupil of the eye elliptical erect.

The form of the contracted pupil of the eye has yet to be observed in a large number of the species.

Mr. Bartlett, in reply to my inquiry, states that “the females of the Long-eared Fox, the Arctic, and the Common Fox have oblong erect pupils, the Black-backed and Common Jackals have round pupils like the Wolf and Dog.”—March 28, 1868.

Mr. Bryan Hodgson, in his collection of Drawings of Nepalese

Animals, represents the Buansu (*Cuon*), the Jackal or Shidar (*Sacalius indicus*), the Cabul Greyhound (*Canis cabulensis*), the Tibetan Terrier, Tibetan Mastiff (with four and five claws), *Vulpes ferrilatus*, *V. indicus*, and *V. subhimachalus*, as all having round pupils; but I doubt if in the three last-mentioned this is not a mistake of the artist.

Dr. Rüppell, in his 'Atlas,' figures the Fennec and the North-African Foxes with round pupils.

The dentition of the family is generally uniform. The normal number of teeth is 42, viz. cutting-teeth  $\frac{6}{6}$ , canines  $\frac{1-1}{1-1}$ , premolars  $\frac{3-3}{4-4}$ , sectorial teeth  $\frac{1-1}{1-1}$ , tubercular grinders  $\frac{2-2}{2-2}$ . The incisors, canines, first premolars, and the last lower molar have a single fang; the second and third upper premolars and all the premolars and molars below, but the last, have two fangs. The upper sectorial or fourth premolar and the last upper true molar have three fangs, the first upper premolar four fangs. (*De Blainville*.)

Some genera of the family present certain anomalies. Thus *Icticyon* has only 38 teeth, there being only one tubercular grinder on each side of each jaw; *Cuon* has 40 teeth—that is, has two tubercular grinders on each side of the upper, and only one on each side of the lower jaw. On the other hand, *Thous* and *Megalotis* have 44 teeth—that is, two tubercular grinders on each side of the upper, and three on each side of the lower jaw. Sometimes some anomalous specimens present an excess over the usual number of teeth: thus M. de Blainville has figured a Mastiff with three tubercular grinders on each side of each jaw, the hinder small, cylindrical. (*Ann. Franç. et Etrang. d'Anat. &c.* ii. p. 313, t. 1. f. 2.)

The sectorial teeth in the upper jaw, in all the typical *Canidæ*, are compressed, three-lobed, with a small internal lobe close to the front edge. In the aberrant *Otocyon*, on the contrary, the sectorial tooth is nearly triangular, almost as wide as long, very unlike those of the other Dogs.

- I. *Tubercular grinders in the upper and lower jaws; false grinders 2 or 3 in each jaw. Head elongate; nose more or less produced.*

#### Family 1. CANIDÆ.

Tubercular grinders two in each jaw; molars  $\frac{6-6}{7-7}$  or more. Feet produced; toes 5/5, straight, free, with blunt, exposed, worn-tipped claws; the front inner toe high up, rarely wanting.

*Canidæ*, Baird, Mam. N. Amer. p. 103, 1859.

1. *Normal Canidæ.* The upper sectorial grinders compressed, three-lobed, with a small tubercle on the front of the inner edge.

Section I. LUPINÆ. The skull thick, solid; the postorbital process thick, convex above and bent down at the tip.

*Lupinæ*, Burmeister.

Subfam. 1. LYCAONINA. Head short, broad; nose short, broad. Teeth large, close together. Palate very broad, short. Tail short, straight.

1. LYCAON.

Subfam. 2. CANINA. Head more or less elongate; nose tapering. Teeth moderate. Palate elongate.

A. *Wolves*. Tail short, straight, bushy. Skull elongate. Old World and America.

\* *Head short; teeth 38; tubercular grinders*  $\frac{1-1}{1-1}$ .

2. ICTICYON. South America.

\*\* *Head short; teeth 40; tubercular grinders*  $\frac{2-2}{1-1}$ .

3. CUON. Old World—Asia.

\*\*\* *Head elongate; teeth 42; tubercular grinders*  $\frac{2-2}{2-2}$ . *Temporal muscles separated by a narrow linear central ridge.*

4. LUPUS. Head moderate; nose broad. Europe and North America.

5. SIMENIA. Head very long; nose slender. Premolars far apart, small. Africa.

6. CHRYSOCYON. Head very long; nose slender. Premolars approximate, large. South America.

B. *Dogs*. Tail elongate, bent or curled. Skull short or elongate.

7. CANIS. Domesticated.

C. *Fox-tailed Wolves*. Tail elongated, hairy. South American.

\* *Teeth 42; tubercular grinders*  $\frac{2-2}{2-2}$ .

8. LYCALOPEX. Pupil circular. Upper tuberculars large.

9. PSEUDALOPEX. Pupil elongate. Upper tuberculars moderate.

\*\* *Teeth 44; tubercular grinders*  $\frac{2-2}{3-3}$ .

10. THOUS.

Section II. VULPINÆ. Skull slight, thin, elongate; nose tapering, long. Postorbital process thin, concave above, and spread out horizontally at the tip.

*Vulpina*, Burmeister.

Subfam. 3. VULPINA.

D. *Foxes*. Tail elongate, bushy, with a gland covered with coloured hair on the upper part, near the base. Skull very long. Upper



sectorial grinders compressed, three-lobed, with a small tubercle on the front part of the inner side; tubercular grinders  $\frac{2-2}{2-2}$ . Pupil often elliptical, erect.

11. VULPES. Ears moderate; ear-bullæ moderate.  
 12. FENNECUS. Ears very large; ear-bullæ large.  
 13. LEUCOCYON. Skull broad in front of orbits.  
 E. *Bristle-tailed Foxes*. Tail elongate, hairy, with a crest of bristles along the upper edge. Teeth like Foxes.  
 14. UROCYON.  
 F. *Raccoon Dog*. Tail short, straight, bushy. Upper sectorial grinders compressed, three-lobed, with a small anterior internal lobe; tubercular grinders  $\frac{2-2}{2-2}$ .  
 15. NYCTEREUTES.  
 II. *Aberrant Canidæ, or Viverrine Dogs*. Upper sectorial teeth small, triangular, as broad as long; tubercular grinders  $\frac{3-3}{3-3}$ ; oblong transverse, subequal.

Subfam. 4. MEGALOTINA. Tail straight, short, bushy. Skull elongate. Ears large.

16. MEGALOTIS.

The subfamilies may be thus arranged:—

- |  |  |  |
|--|--|--|
| I. Skull solid; postorbital process thick, convex above. LUPINÆ .....  | $\left\{ \begin{array}{l} 1. \text{LYCAONINA} \dots\dots\dots \\ 2. \text{CANINA} \dots\dots\dots \\ \text{Wolves} \dots\dots\dots \\ \text{Caninia (Dogs)} \dots\dots \\ \text{Fox-tailed Wolves} \dots\dots \end{array} \right.$ | $\left. \begin{array}{l} \text{Tail short, straight, bushy.} \\ \text{Tail elongate, curled to the left.} \\ \text{Tail elongate, straight.} \end{array} \right\}$ |
|  |  |  |
| II. Skull thin; postorbital process thin, concave above. VULPINÆ ..... | $\left\{ \begin{array}{l} 1. \text{Foxes} \dots\dots\dots \\ 2. \text{Bristle-tailed Foxes} \dots\dots \\ 3. \text{Raccoon Dog} \dots\dots\dots \\ 4. \text{Viverrine Dog} \dots\dots \end{array} \right.$                         | $\left. \begin{array}{l} \text{Tail elongate, soft, bushy.} \\ \text{Tail elongate, bristly, bushy.} \\ \text{Tail short, straight, bushy.} \end{array} \right\}$  |
|  |  |  |

I. Normal Canidæ. *The upper sectorial grinders compressed, three-lobed, with a small tubercle on the front of the inner edge.*

Section I. LUPINÆ. *Skull thick, solid; postorbital process thick, convex above, and bent down at the end.*

*Lupinæ, part., Burmeister and Spencer Baird.*

Subfam. 1. LYCAONINA.

Head short, broad; nose short, broad. Teeth large, close together. Palate very broad, short.

1. LYCAON. Hyæna Dog.

Skull short, broad; nose short, broad, swollen; palate short,

Fig. 1.



Skull of *Lycan venaticus*. (No. 1141.)

very broad; internal nasal opening broad. Postorbital process thick, convex above, bent down at the end. Teeth 42; false grinders  $\frac{3-3}{3-3}$ ; sectorial  $\frac{1-1}{1-1}$ ; molars  $\frac{2-2}{2-2}$ ; the upper and lower premolars acutely dentated on the front and, especially, on the hinder edge; upper sectorial teeth strong, elongate, trigonal, broad, with a small but well-marked interior lobe in front. First upper tubercular tooth large, with a broad rounded internal lobe; the second upper tubercular oblong transverse, much smaller; lower hinder tubercular very small, cylindrical.

This group is intermediate between the Hyæna and the Dog. The manner of copulation is said to be different from the Dog's, and similar to that of the Hyæna.

1. LYCAON VENATICUS. Simur or Mebbra. (Fig. 1, p. 496.) B. M.

*Kynos pictus*, Rüppell.

*Lycaon tricolor*, Brooks.

*L. typicus*, A. Smith.

*L. venaticus*, Gray, Cat. Mamm. B. M. 67; Gerrard, Cat. of Bones in B. M. 90.

*Canis aureus*, Thunberg, Mém. Acad. Pétersb. iii. 302.

*Hyæna picta*, Temm. Ann. Gén. Sci. Phys. iii. 54, t. 35; Kuhl, Beitr. 75.

*H. venatica*, Burch. Travels, i. 456; fig. ii. 222, 232.

*Chien hyénoïde*, Cuv. Oss. Foss. iv. 386.

*Hyæna Dog*, Griffith, A. K.

*Canis tricolor*, Griffith, A. K. v. 288, t.

*C. pictus*, Desm. Mamm. Suppl. 338; Blainv. Ostéogr. t. 8 (skull), t. 9 (teeth).

Var. ? *Canis pictus*, Cretsch. in Rüppell's Atlas, 35, t. 12.

*Hab.* Africa: Cape of Good Hope (*Burchell*) (called *Mebbra*); East Africa, Cordofan (*Rüppell*) (called *Simur*).

## Subfam. 2. CANINA.

Head more or less elongate; nose tapering. Teeth moderate. Palate elongate.

A. WOLVES. Tail short, straight, bushy, not reaching below the heel.

\* Head short. Skull elongate. Teeth 38; tubercular grinders  $\frac{2-2}{2-2}$ , rarely  $\frac{2-2}{1-1}$  or  $\frac{1-1}{1-1}$ .

## 2. ICTICYON.

Head short, broad. Teeth 38; false grinders 3.3 in each jaw; flesh-teeth large, three-lobed; upper with a small internal lobe on the front edge; the lower sharp-edged; tubercular grinders  $\frac{1-1}{1-1}$ ; upper large, triangular, transverse; lower small, circular; false grinders  $\frac{3-3}{3-3}$ .

*Icticyon*, Lund, 1842; Burmeister, *Fanna Bras.* ii. 1.

*Cynalicus*, Gray, *Ann. & Mag. N. H.* 1846, p. 293.

*Melictes*, Schinz, 1849.

### 1. ICTICYON VENATICUS.

B.M.

*Icticyon venaticus*, Lund, *Fauna Bras.* 184; Wagner, *Wieg. Arch.* 1843, p. 355; Burmeister, *Fanna Bras.* i. t. 18-20; Gerrard, *Cat. of Bones of Mamm.* 89; Van der Hoeven, *Kais. Ak. d. Wiss. u. Naturg.* vii. (tubercular grinders  $\frac{1-1}{1-1}$ , trigonal).

*Cynalicus melanogaster*, Gray, *Ann. & Mag. N. H.* 1846, xvii. 293; *Wieg. Arch.* 1847, p. 15. (B.M.)

*Cynogale venatica*, Lund, *K. D. V. Selsk.* 1842.

*Melictis beskii*, Schinz, *Wieg. Arch.* 1849, p. 10.

*Canis brachyotus*, Blainv. *Ostéogr.* t. 9 (skull), t. 12 (teeth).

*Hab.* Brazil.

\*\* *Teeth* 40; *tubercular grinders*  $\frac{2-2}{1-1}$ . *Temporal muscles separated by a narrow cranial ridge.*

### 3. CUON.

Skull short; nasals elongate. *Teeth* 40; *tubercular grinders*  $\frac{2-2}{1-1}$ , the lower hinder tubercular grinder deficient.—*Blainv. Ann. Franç. et Etrang. d'Anat.* i. t. 8. f. 4.

The small hinder tubercular grinders of the upper and lower jaw deficient. (See *Blainv. Ostéogr.* t. 9?)

#### 1. CUON PRIMÆVUS. Buansuah.

B.M.

Skull—nose short, broad, swollen; forehead broad, convex, gradually shelving from the nose line; nasals produced behind the hinder upper edge of the maxillaries.

*Canis primævus*, Hodgson, *P. Z. S.* 1833, p. 111; *Blainv. Ostéogr. Canis*, 49, t. 8 (skull), t. 9 (teeth); *Laur. & Bazin, Ann. d'Anat. et Phys.* i. t. 8. f. 4 (skull); *Hodgson, Trans. Asiat. Soc.* , t.; *Gray, Cat. Mamm. B. M.* 57.

*Cuon primævus*, Gerrard, *Cat. of Bones of Mamm. B. M.* 81.

*Canis himalayanus*, Lesson.

*Hab.* Nepal (*Hodgson, B. M.*); Cashmere (*Abbott*).

#### 2. CUON ALPINUS.

B.M.

*Canis alpinus*, Pallas, *Zoogr. Rosso-Asiat.* i. 34; Van der Hoeven, *Kais. Akad. d. Wiss.* vii. t. 17 (teeth); *Gray, Cat. Mamm. B. M.* 57; *Schrenck, Amurlande*, 48.

*Cuon alpinus*, Gray; Gerrard, *Cat. of Bones of Mamm. B. M.* 81.

*Hab.* Siberia, Altai Mountains (*Brandt*) (skull, B. M.).

Skull very like that of the preceding species, if different.

#### 3. CUON SUMATRENSIS. (Fig. 2, p. 499.)

B.M.

Skull—nose short, broad, swollen, slightly raised above the nose-

Skull of *Cuon sumatrensis*. (Sumatra, No. 160 a.)

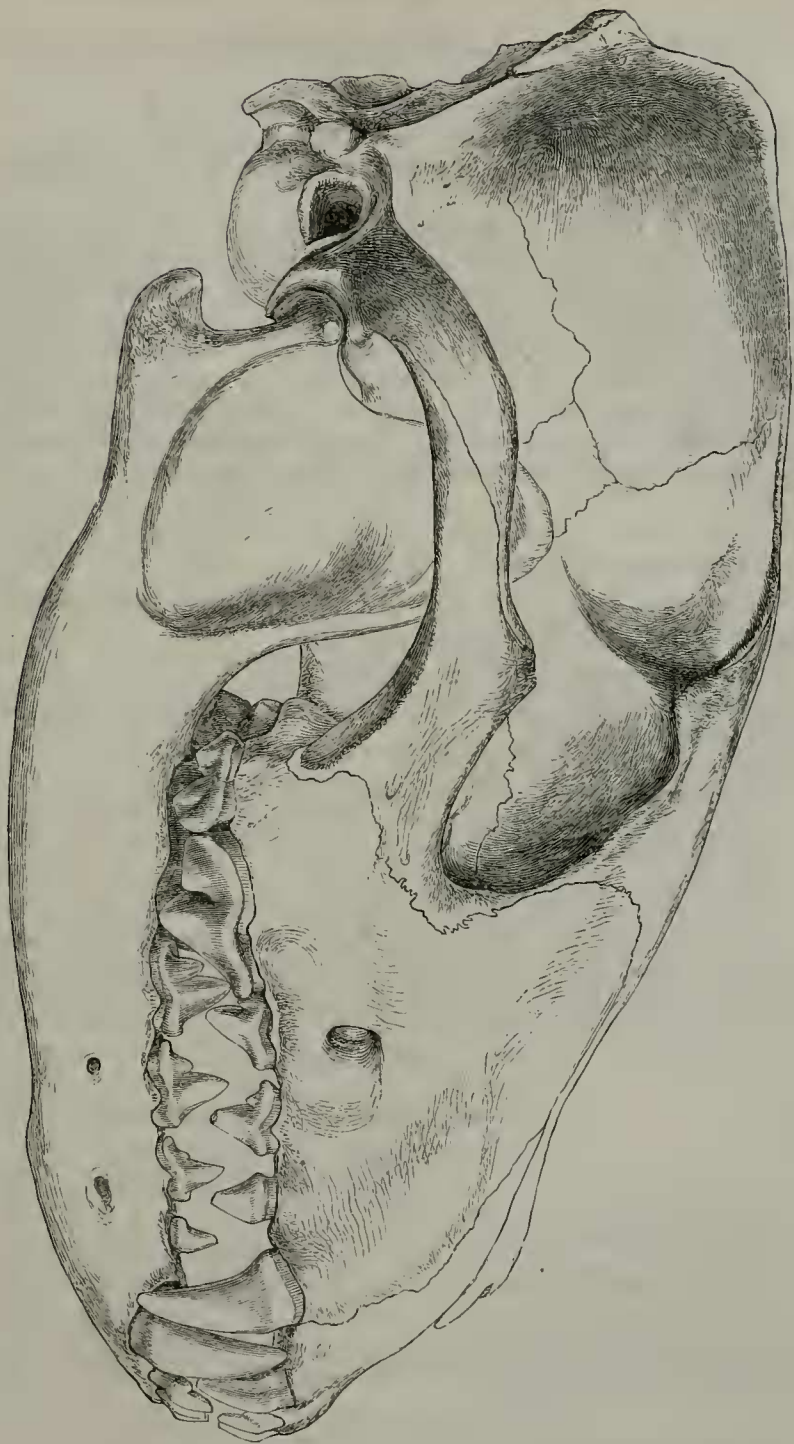


Fig. 2.

line; nasals produced behind the hinder upper edge of the maxillaries.

*Canis (familiaris, var.) sumatrensis*, Hardwicke, Linn. Trans. xiii. 235, t. 25; Raffles, Linn. Trans. xiii. 249.

*Canis sumatrensis*, F. Cuv. Dict. d'H. N. viii. 557.

*Cuon sumatrensis*, Gerrard, Cat. of Bones of Mamm. B. M. 81.

*Hab.* Sumatra (B. M.); Malacca (Carlton, B. M.); Java (*Leschenault*, B. M.).

The skull figured by De Blainville (*Ostéogr.* t. 8) is that of a domestic Dog, perhaps from Java. The skull in the British Museum is very like that of the *Cuon alpinus*. A skeleton sent from Paris, and marked "*Canis javanicus*" (160 e), is a *Cuon*; and the skull is so like that of *Cuon sumatrensis* that I cannot discover any difference between them. I suppose this is the animal named *Canis rutilans* by Boie, and *C. hodophylax*, *C. hodophilax*, and *C. hippophylax* by Temminck, in the 'Fauna Japonica' called *Jamainu*, said to have small, erect ears, and to be of the form and size of a Wolf.

#### 4. CUON DUKHUNENSIS. Dhole.

B.M.

Skull—nose slender, elongate; nasal bones the same length. Forehead much raised above the nose-line.

*Canis dukhunensis* or *Kolsum*, Sykes, P. Z. S.

*Cuon dukhunensis*, Gray, Cat. Mamm. B. M. 37; Gerrard, Cat. of Bones of Mamm. 81.

*Canis dhola*, Gray, Griff. A. K.

*Canis familiaris, var.*; Elliot, Madras Journ. x. 100.

*Wild Dog* or *Dhole*, Williamson, Wild Sports.

?*Dhole*, Wooler.

*Hab.* India; Deccan (*Sykes*, B. M.).

The skull, in the British Museum, from Col. Sykes is of a young specimen changing its milk-teeth. There is a second skull in the Museum (158 b), received from the Zoological Society under the name of *Canis dukhunensis*; but it appears to be rather the skull of *C. primævus*.

	<i>C. primævus.</i>		<i>C. alpinus.</i>		<i>C. sumatrensis.</i>		<i>C. dukhunensis.</i>	
	158 c. in. lin.	161 a. in. lin.	160 a. in. lin.	160 c. in. lin.	162 a. in. lin.			
Length from nose to occipital condyle	6 9	7 0	6 3	6 3	6 6			
— of nose from front of orbits...	2 9	2 11	2 7	2 8	3 0			
— of lower jaw .....	5 4	5 9	4 11	5 2	4 10			
Width of braincase, over ears .....	2 6	2 7	2 4	2 4	2 2			
— of forehead between orbits ...	1 4	1 6	1 3	1 2½	1 1			
— of nose at preorbital foramen.	1 6	1 9	1 5½	1 5½	1 5			
— at back of zygomatic arches ...	4 1	4 3	3 8	3 11	3 6			
Height of jaw at front of orbit....	3 3	3 3	2 11	3 3	2 11			

All adult but 162 a.

## 4. LUPUS. Wolf.

Head moderate, elongate; nose moderate, tapering. Upper pre-molars slightly separated.

## 1. LUPUS VULGARIS. European Wolf. B.M.

*Canis lupus*, Linn. Fauna Suecica, 3; Syst. Nat. i. 58; Gerrard, Cat. of Bones of Mamm. 84.

*Lupus vulgaris*, Brisson, R. A. 235.

*Lupus sylvestris*, Aldrov. Digit. 173, fig.

*Wolf*, Pennant.

*Loup*, Buffon, H. N. vii. 39, t. 3 (skull).

*Loup d'Europe* (*C. lupus*), Blainv. Ostéogr. t. 3 (skeleton), t. 6 (skull).

*Hab.* Europe, France (*B. M.*).

*Var.* Black. Black Wolf.

*Canis lycaon*, Erxleben, Syst. 560; Schreber, Säugeth. 353, t. 89.

*C. lupus niger*, Herm. Obs. Zool. 32.

*Loup noir*, Buffon, H. N. ix. 362, t. 41; F. Cuv. Mamm. Lith. t.

*Black Wolf*, Shaw.

*Hab.* Europe, Pyrenees.

## 2. LUPUS CHANCO. The Chanco or Golden Wolf. B.M.

Fur fulvous, on the back longer, rigid, with intermixed black and grey hairs; the throat, chest, belly, and inside of the legs pure white. Head pale grey-brown; forehead grizzled with short black and grey hairs. Length of the body and head 42, tail 15 inches. Skull  $8\frac{1}{4}$  inches long.

*Canis chanco*, Gray, P. Z. S. 1863, p. 94; Ann. & Mag. N. H. ser. 3. xii. p. 475.

? *Lupus laniger*, Hodgson, Blyth, Journ. Asiat. Soc. Beng. 1847.

*Hab.* Chinese Tartary (*Lieut. W. P. Hodnell*, B.M.).

The skull 1422 *a* is that of a normal European Wolf and about the same size (but the nose is longer, rather more slender); and the teeth, as well as the shape of the skull, are very similar to those of that animal. Two small grinders below behind the canines.

## 3. LUPUS OCCIDENTALIS. American Wolf. B.M.

Skull—forehead convex, rounded; internal nostrils broad in front and narrow behind.

*Canis lupus griseus et albus*, Sabine, Journ. 654; Aud. & Bachm. N. A. Quad. iii. 276, 1854.

*Canis lupus occidentalis*, var. *griseus et albus*, Richard. F. Bor.-Am. i. 66, 1829.

*C. occidentalis*, Dekay, Z. N. Y. i. 42, t. 27. f. 2; S. Baird, Mamm. N. A. 105; Gerrard, Cat. of Bones of Mamm. 84. (Skull 165 *e.*)

*C. variabilis*, Pr. Max. Reise N. A. ii. 95, 1841.

? *Lupus gigas*, Townsend, Journ. Acad. N. S. Phil. ii. 75, 1850.

*Canis lupus canadensis*, Blainv. Ostéogr. t. 7 (skull).

*Hab.* North America (B.M.).

Var. 1. *nubilus*. "Colour light sooty or plumbeous brown."

*Canis nubilus*, Say, Long's Exped. i. 168, 1822.

*C. occidentalis*, var. *nubilus*, Spencer Baird, Mamm. N. A. 111.

Var. 2. *mexicanus*. "Fur varied with grey and black; neck maned more than usual; a black or dusky band encircling the muzzle; a dusky slope down the fore leg."—*Baird*.

*Canis mexicanus*, Linn. S. N. i. 60.

*C. occidentalis*, var. *mexicanus*, S. Baird, Mamm. N. A. 113.

*Xoloit cuintli*, Hernand. Mex. 479, fig.

*Lupus mexicanus*, Brisson, R. A. 237.

*Loup de Mexique*, Buffon, N. II. xv. 149.

*Mexican Wolf*, Penn.

*Cuetlachti*, Fernand. N. Hisp. 7.

*Hab.* Mexico (*Hernand.*); Santa Cruz; Sonora.

Var. 3. *ater*. Black Wolf. B.M.

Forehead of skull concave in the central line; internal nostrils narrow, parallel.

*Canis lycaon*, Harlan, Fauna Amer. 126, 1828.

*C. lupus ater*, Rich. F. Bor.-Am. i. 70; Aud. & Bachm. N. A. Quad. 126, t. f. 7, 1851.

*C. occidentalis*, var. *ater*, S. Baird, Mamm. N. A. 113. (Skull 165 c, B.M.)

*Hab.* Florida; Georgia.

Var. 4. *rufus*.

Mixed red and black above, lighter beneath.

*Canis lupus*, var. *rufus*, Aud. & Bachm. N. A. Quad. ii. 240, t. 82, 1851.

*C. occidentalis*, var. *rufus*, S. Baird, Mamm. N. A. 113.

*Hab.* Texas.

4. LUPUS ANTHUS. Dieb. (Fig. 3, p. 503.) B.M.

Skull (816 e)—forehead flattish, rather concave; pterygoid bones converging behind. Sectorial teeth prominent in the tooth-line and placed obliquely to the other teeth. Internal nostril narrow, sides parallel.

*Canis anthus*, F. Cuvier, Mamm. Lithogr. xxii. t.; Rüppell, Zool. Atlas, 44, t. 17; Gray, Cat. Mamm. B. M.; Gerrard, Cat. of Bones of Mamm. 85.

*Hab.* West Africa, Senegal (F. Cuvier); Algiers; Tunis (*Frazer*) North Africa; Egypt; Nubia (*Rüppell, Christie*).

Var. Head narrow. Skull (816 a) very like that of *L. anthus* (816 e), from the Zoological Gardens. The forehead and face very much narrower compared with its length; the whole length of the face, from the end of the palate to the front teeth, and the canines, is smaller.

*Hab.* Algiers and Tunis.



Skull of *Lepus arthus*. (Tunis, No. 816*b*.)

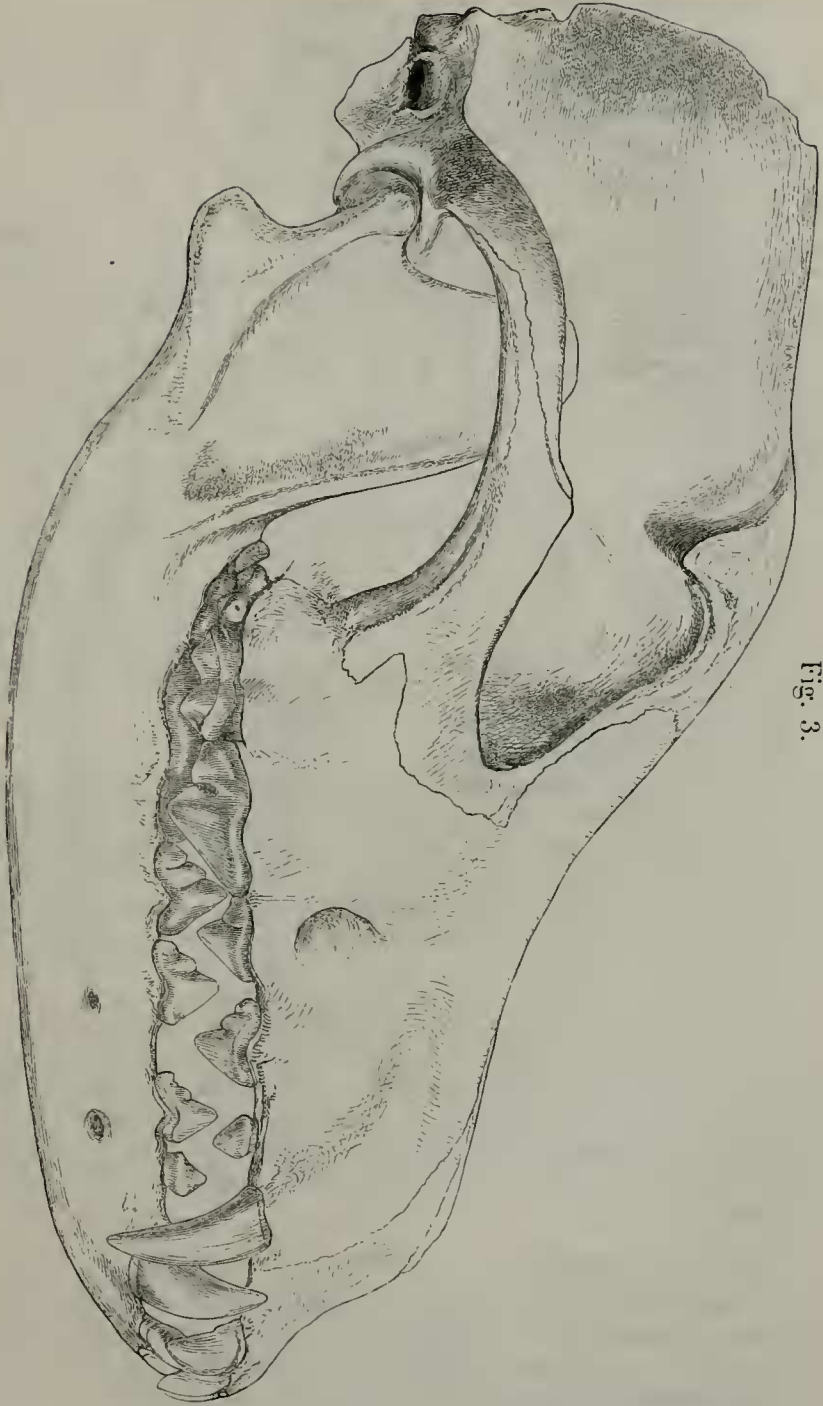


Fig. 3.

There is another skull, 816 *b* (fig. 3, p. 503), from Tunis, that is somewhat intermediate in width; it wants the occiput.

	816 <i>c</i> .	816 <i>b</i> .	816 <i>a</i> .
	in. lin.	in. lin.	in. lin.
Length of skull .....	6 7	6 5?	6 2
Width at zygomata .....	4 2	3 9	3 6
—— at foramen .....	—	—	—
—— before orbits .....	1 6	1 5	1 3
—— of palate at outer hinder edge of sectorial teeth	2 5	2 1	2 1

### 5. LUPUS AUREUS. Jackal.

B.M.

Skull—nose sloping on the sides, broad in front of orbits. The sectorial tooth is placed obliquely in respect to the line of the pre-molars and tubercular grinders.

*Canis aureus*, Linn. S. N. i. 59; Pallas, Zoogr. Rosso-Asiat. i. 39, t. 3; Gray, Cat. Mamm. B.M. 58; F. Cuv. Mamm. Lith. t.; Blainv. Ostéogr. t. 4 (skull, var. *barbarus*), t. 6 (var. *mareoticus*, skull rather wider).

*Canis barbarus*, Shaw, Zool. i. 54.

*Barbary Jackal*, Pennant, Quad. i. 260.

*Lupus aureus*, Kampf. Amœn. Exot. 413, t. 407. f. 3.

*Canis micrurus*, Reichenbach.

*Thos*, Pliny.

*Le Chacal et l'Adivè*, Buffon, H. N. xiii. 255, Suppl. iii. 112, t. 16.

*Schakall*, S. G. Gmelin, Reise, iii. 80, t. 13; Gùldenst. in Nov. Com. Petrop. xx. 449, t. 10.

*Jackal*, Penn., Shaw.

*Hab.* India; Ceylon (*Reid*).

The several skulls in the British Museum differ from each other. 163 *c* is very wide at the zygomatic arches. Length 5 inches 4 lines, width 3 inches 3 lines. The aperture of the internal nostril is wide, 8 lines, much wider than in other skulls. The skull of a Jackal from Barbary, sent to the Zoological Gardens by E. W. Drummond Esq., 163 *d*:—length 5 inches 1 line, width 3 inches 1 line; aperture of internal nostril 6 lines.

163 *c*. Nepaul. Presented by B. Hodgson, Esq.

A skeleton with skull in the British Museum, 163 *k* (*Canis aureus*, part., Gerrard), from the Zoological Gardens is peculiar. Length 5 inches 4 lines, width 2 inches 2 lines, internal nostril 5 lines. The skull like that of *Lupus aureus*; but the coronal ridge is rather dilated or vase-shaped in the middle of the length; and the upper hinder tubercular grinders rather larger in comparison with the other grinders.

### 6. LUPUS PALLIPES. The Landgak.

B.M.

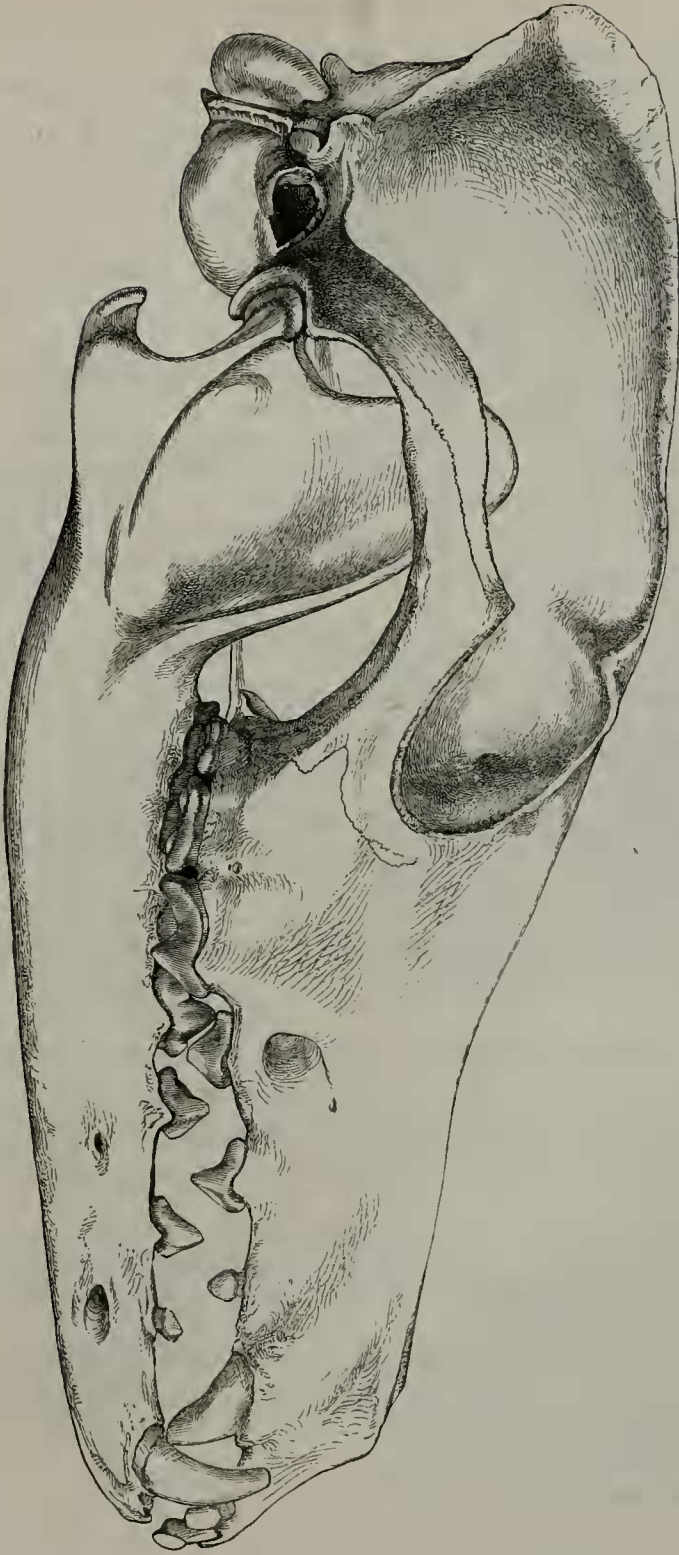
Coronal crest linear, high; upper sectorial teeth large, elongate.

*Canis pallipes*, Sykes, P. Z. S. 1831, p. 101; Gray, List Mamm. B.M. 58; Gerrard, Cat. of Bones of Mamm. 82.

*Canis lupus*, Hodgson; Elliot, Madras Journ. x. 101.

*Succalinus indicus*, Hodgson, MS.

*Hab.* Nepaul (*Hodgson*); India (*Oldham*, 163 *e*).



Skull of *Simenia simensis*. (Abyssinia, No. 126 a.)

Fig. 4.

## 5. SIMENIA.

Head elongate; nose very slender, elongate. Skull with a very slender elongate nose; the premolars small and very far apart.

1. SIMENIA SIMENSIS. Abyssinian Wolf. (Fig. 4, p. 505.) B.M.  
*Canis simensis*, Rüppell, Abyss. Fauna, t. 14; Gray, Cat. Mamm. B.M. 58; Gerrard, Cat. of Bones of Mamm. 82.  
*Hab.* Abyssinia (Rüppell, type in B. M.).  
 Skull 162 *a* (fig. 4) Length 7 inches 9 lines. Coronal ridge linear.

## 6. CHRYSOCYON.

Head very long; nose slender. Pupils round. Tail short, reaching only to the hocks.

Skull elongate; nose very long, slender; coronal crest single, linear; postorbital process thick, convex above, bent down at the tip. Premolars approximate, large. Sectorial tooth in the same line as the other teeth. Internal palate narrow.

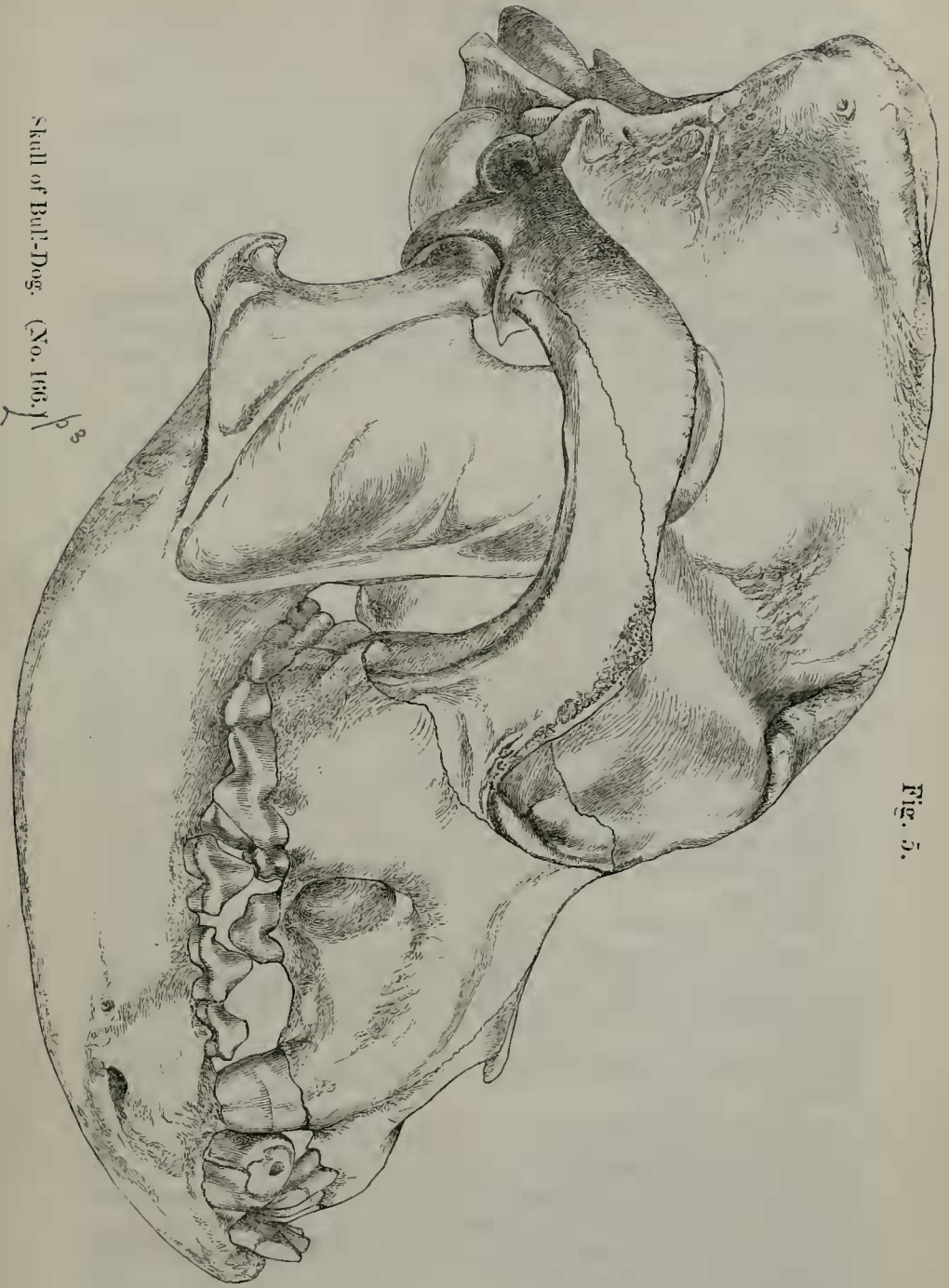
*Chrysocyon*, Ham. Smith, Dogs; Burmeister, Faun. Bras. 24.

\* *Upper sectorial tooth moderate.* Chrysocyon.

1. CHRYSOCYON JUBATA. Guara. B.M.  
*Canis mexicanus*, Sonn. Nouv. Dict. vi. 505 (not Linn.).  
*Canis jubatus*, Desm. Mamm. 198; Burm. Faun. Brasil. t. 21, t. 26. f. 1.  
*Chrysocyon jubatus*, Gerrard, Cat. of Bones of Mamm. 89.  
*Canis campestris*, Pr. Max. Beitr. ii. 334, n. 1; Blainv. Ostéogr. t. 7 (skull).  
*Loup rouge*, Cuv. R. A. i. 154, iv. t. 1.  
*Hab.* South America (solitary); Paraguay (*Azara*); Brazil (*Pr. Max.*); Buenos Ayres.

\*\* *Upper sectorial tooth transverse, very large.* Neocyon.

2. CHRYSOCYON LATRANS. Prairie-Wolf. Coyote. B.M.  
 Muzzle short, like that of a Fox; tail short, like a Wolf's.  
 Skull 171 *a* very like *Lupus anthus*; but nose longer and more slender.  
*Canis latrans*, Say, in Long's Exped. i. 168; And. & Bachm. N. A. Quad. ii. 150, t. 71, 1829; Baird, Mamm. N. A. 113; Gerrard, Cat. of Bones of Mamm. 85; Gray, Cat. Mamm. B. M. 58; Blainv. Ostéogr. t. 7 (skull).  
*Vulpes velox*, Gerrard, Cat. of Bones of Mamm. n. 1237 *a*.  
 Var. Small. *C. frustror*, Woodhouse, Proc. Ac. N. S. Philad. v. 147 (1850), v. 157 (1851).  
*Small Wolves*, Dupretz.  
*Burrowing Dog*, Lewis & Clark.



Skull of Bull-Dog.

(No. 166.)

3/3

Fig. 5.

*Cased Wolves*, Furrier's List.

*Lyciscus cagotis*, Ham. Smith, Nat. Lib. Dogs.

? *Canis ochropus*, Eschsch. Zool. Atlas, i. t. 11; Gray, List Mamm. B. M. 59; Zool. Sulph. 32, t. 10.

*Hab.* North America (in packs): Upper Missouri (*Long*); California (*B. M.*).

"Replaces the Jackal of the Old World. Brings forth its young in a burrow. Barks like a Domestic Dog."—*S. Baird*.

Skulls 171 *a, b, c*. Width at zygomata 3 inches 4 lines; length of palate 3 inches 5 lines, of the upper jaw at the hinder edge of the sectorial tooth 2 inches, at the base of the canines 1 inch 1 line.

1237 *a*. *Vulpes velox*, Rich.

Skull 171 *c*. Length 7 inches; width at zygomata 3 inches 10 lines, at preorbital foramen 1 inch 3 lines, at outer hinder end of the sectorial tooth 2 inches 1 line, of the upper jaw at the base of the canines 1 inch 1 line; length of palate 3 inches 9 lines.

B. DOGS. *Tail elongate, curved or curled; temporal muscle only separated by a line or coronal ridge.*

#### 7. CANIS. Dog.

Head moderate or elongate. Ears often dependent or recurved. The small hinder tubercular grinder of the upper and lower jaws well developed.

1. CANIS FAMILIARIS. Dog. (Fig. 5, p. 507.) B.M.

*Canis familiaris*, Linn. S. N. i. 56; Gray, Cat. Mamm. B. M. 57; Gerrard, Cat. of Bones of Mamm. 82.

*C. domesticus*, Linn. Mus. Adolph. Frid. i. 6.

*C. fam. terræ novæ*, Blainv. Ostéogr. Canis, t. 8 (skull).

*Chien*, Buffon, H. N. v. 300, t. 15.

*Chien domestique*, Cuv. R. A. i. 152.

*Dog*, Penn.

*Common Dog*, Shaw.

*Hab.* The World where inhabited by man.

Skull 166 *f*. Bhotea Dog (black and tan). Nepaul (*Hodgson*). Length 8 inches 2 lines. Very like the skull of the Wolf of Europe. B.M.

Skull 166 *b*. Tibetan Mastiff. Nepaul (*Hodgson*). Length 9 inches. B.M.

Skull 166. Bull-Dog (fig. 5, p. 507). Utrecht Collection. B.M.

*Canis familiaris nepalensis*, Blainv. Ostéogr. t. 7 (teeth).

*Canis familiaris japonicus*, Temm. Fauna Japon. t. 10. f. 5, 6 (skull); Gerrard, Cat. of Bones of Mamm. 84.

*Canis familiaris chinensis*, Gray, P. Z. S. 1868, f. (skull). B.M.

*C. fam. novæ hiberniæ*, Fischer, Syn. 186.

*Native Dog of New Zealand*.

B.M.

2. *CANIS CEYLANICUS*, Shaw, Zool. i. 312.*Chien sauvage indien*, Vossmar, Descript. 1775, t.*Ceylon Dog*, Penn.*Hab.* Ceylon.3. *CANIS TETRADACTYLA*, Fischer, Syn. 292.*Chien sauvage de Cayenne*, Actes de la Soc. d'H. N. de Paris, i. 115; Meyer, Zool. Am. i. 134.*?Canis familiaris cayanensis*, Blainv. Ostéogr. t. 7\* (skull).*Hab.* Cayenne.4. *CANIS DINGO*.Ears erect. Tail elongate. Tubercular grinders  $\frac{2}{2}$ .—*Blainville*.*Canis dingo*, Blumenb. Handb. 103; Gray, List of Mamm. B. M. 57; Gerrard, Cat. of Bones of Mamm. 84.*C. familiaris australasiae*, Desm. Mamm. 190; Blainv. Ostéogr. t. 8 (skull).*Dingo* or *Australasian Dog*, Shaw, Gen. Zool. i. 277, f. 76.*Hab.* Australia.Var. *sumatrensis*. Skull short; face short, broad. Tubercular grinders  $\frac{2}{2}$ , well developed.*Canis familiaris sumatrensis*.*Hab.* Sumatra.

The Domestic Dog has been bred into various well-marked varieties, some of which have existed from the earliest historical period, and are to be found everywhere the companions of man. New varieties are very rarely if ever produced; and some of the old or well-known varieties have a great tendency to die out, at least for a time. Indeed all varieties are only to be retained by careful breeding and weeding—that is, by the destruction, or at least exclusion from breeding, of the examples that do not come up to the standard. If this is not done, they soon deteriorate into the common Cur or the Pariah Dog of India.

Most varieties occur of very different sizes—from very large to large, middle-sized, small, or very small.

The varieties always present the same general external appearance, and often have a peculiar colour. For example, the Poodles always have curly hair. Other varieties occur with long or short smooth hair, with bristling or rough hair, curly hair, or with a nearly naked skin; the latter generally also have imperfect teeth, or teeth that early decay or drop out.

Some varieties are malformations, as the Bull-Dog and the Pug Dog have a short, imperfect upper jaw and a broken nose; but this malformation occurs as a subvariety among Spaniels, as in the Japanese Sleeve-Dog; and other Dogs (continued by breeding) have the lips, on the sides of the mouth, very large and pendulous, as the Mastiff. Several varieties also occur presenting short-legged long-bodied breeds—as the Turnspit, the Scotch Terrier, and the Muff-Dogs or Short-legged Spaniels.

The Domestic Dog presents three distinct forms of ears. Some, as the Spitz Dog, have short ovate, erect, hairy ears; others, like the Greyhound, have elongated ears that are folded together, bent backward on the sides of the head; while the Hound and Spaniels have broad ears bent down on the sides of the head. When the varieties with different forms of ears are bred together, intermediate forms may be observed.

The tail, in most varieties, is elongated, tapering at the end; it is often more or less curved, and sometimes closely spirally bent. But the tails of many Domestic Dogs are cut; and some few breeds are said to be born tailless. But I have never seen any examples of the latter.

Varieties which are very distinct in their external form, length and kind of hair, and colour, have skulls so alike that they are not to be distinguished by any appreciable character. Thus it is impossible to distinguish the skull of a Terrier from that of a Spaniel, or either of these from that of the Pariah Dog of India, or the "Mongrel Cur" as it is called in England.

Some of the figured and named varieties, as the Lion-Dog (*Chien-lion*, Buffon, v. t. 40. f. 2; *Canis familiaris leoninus*, Gmelin), are described from Dogs that had been artificially prepared; and of some, as the Prick-Eared Dog, the ears had been artificially clipped; and the same is the case with some of the short-tailed Dogs.

If the varieties of Dog are stumbling-blocks to the systematic zoologist, which some say they are (for what reason I cannot conceive), they are never mistaken by their wild allies. It is true that a Wolf will breed with a female Dog, but so will a wild Pheasant with a domestic hen. The system of improving the breed of domestic animals by breeding and weeding seems to have been co-existent with human civilization; and to keep up the good breeds it is as necessary to be carefully attended to now as in the earliest period, showing that the varieties produced have no tendency to become perpetual.

The varieties of the Dog, like the varieties of Oxen, Sheep, Pigs, Poultry, and Pigeons, are limited; and the limits seem to have been early discovered, as most, if not all, of the varieties now existing seem to have been known in the earliest historical period, and even anterior to it.

How any one can think that the differences between varieties of domestic animals are such as zoologists would use to distinguish genera and species, is a mystery that I cannot understand; and the theory that the variation produced by breeding and weeding, or selection as it is called, is to be regarded as the origin of the difference between natural species, is more astonishing, and can only have arisen for want of careful study of the subject. There are some minds so constituted, even among the well educated, who believe in animal magnetism, metallic factors, table-turning, phrenology, spiritualism, mesmerism, the great pyramid, natural selection, and mimicry of animals—and some even two or more of these theories in succession, or at the same time.



- C. FOX-TAILED WOLVES. *Tail elongate, reaching below the heels, more or less curved, and covered with more or less elongated hair not forming a full brush.* South America.

### S. LYCALOPEX.

Pupil circular. Tail reaching below the hocks. The upper tubercular teeth oblong, taken together much longer than the flesh-tooth. South American.

*Cerdocyon*, Ham. Smith, Dogs, i. 289, 1839.

*Lycalopex*, Burmeister, Fauna Brasil. 24, 31.

#### 1. LYCALOPEX VETULUS.

B.M.

Tail very long, lushy; underside pale yellow. Snout reddish brown. Coronal ridge narrow linear.

*Canis vetulus*, Sund. Bras. 21, t. 40.

*C. azaræ*, Pr. Wied, Abild. t.

*C. (Lycalopex) vetulus*, Burmeister, Faun. Bras. 37, t. 23, t. 28. f. 1, t. 29. f. 1.

*Hab.* Brazil.

#### 2. LYCALOPEX FULVICAUDUS.

B.M.

Underside of tail reddish yellow. Temporal muscles separated by a well-marked narrow lanceolate crown, which is linear for one-fourth of its length behind (see Burm. t. 28. f. 2). The upper sectorial tooth short, broad, thick; upper tubercular teeth large, nearly similar in size and form.

*Canis fulvicaudatus*, Sund. Bras. 20.

*C. (Lycalopex) fulvicaudus*, Burm. Faun. Bras. 40, t. 24, t. 28. f. 2, t. 29. f. 2.

*Hab.* South America.

Skull 820 *a* is very like those figured by Burmeister, t. 28. f. 2, t. 29. f. 2; but the lower edge of the lower jaw is not so much arched.

Skulls 821 *a* and *b* both differ from 820 *a* in the upper sectorial and the tubercular grinders being smaller than they are in that skull. In 820 *a* the upper sectorial tooth is thick, nearly triangular, broad, and with a well-marked lobe on the front of the inner edge. In 821 *a* it is nearly of the same form—if anything, rather more equilaterally triangular; but it is smaller than in 820 *a*.

	in.	lin.
Skull 820 <i>a</i> .....	4	3 long.
Skull 821 <i>a</i> .....	4	0 ,,

It is evident that the teeth of these Dogs vary in size in the same species.

#### Var. 1. *chiloensis*.

B.M.

Upper sectorial tooth compressed, with inner front lobe rather in front of the front edge of the tooth; crown of skull flat, narrow,

sub-vaseshaped. Hinder opening of the palate broad, expanded. Skull 821 *b*, 4 inches 2 lines long.

*Vulpes azaræ* (Chiloe), Waterhouse, MS.

*Vulpes vetulus* (partly), Gerrard, Cat. Bones of Mamm. (821 *b*.)

*Hab.* Chiloe.

### 9. PSEUDALOPEX.

Tail elongate, reaching below the hocks. Pupil elliptical in the daylight. Skull with a linear coronal ridge; the upper tubercular teeth taken together scarcely so long as, or very little longer than the flesh-tooth.

*Pseudalopex*, Burmeister, Faun. Bras. 24, 44.

\* *The fore legs grey externally; soles of the feet blackish brown.*

1. PSEUDALOPEX AZARÆ. Agoua rachay. B.M.

Tubercular grinders 3; front always largest.

*Canis azaræ*, Pr. Max. Beitr. ii. 338; Abbild. t.; Darwin, Zool. Beagle, xiv. t. 7; Blainville, Ostéogr. t. 4 (skull).

*C. brasiliensis*, Schinz, Cuv. Thierr. i. 222.

*Vulpes azaræ*, Gray, Cat. Mamm. B. M. 60; Gerrard, Cat. of Bones of Mamm. 87.

*Agoua rachay*, Azara, i. 317.

*Canis melanostomus*, Wagner, Wieg. Arch. 1843, i. 358.

*C. (Pseudalopex) azaræ*, Burm. Faun. Bras. 24, 44, t. 28. f. 3, t. 29. f. 3.

*C. azaræ*, Van der Hoeven, t. i. f. 8.

*Hab.* South America; Brasil (*Pr. Max.*); Paraguay (*Azara*); Patagonia (*Darwin*).

\*\* *The fore legs entirely red-yellow; soles of the feet red-brown.*

2. PSEUDALOPEX GRISEUS. B.M.

Fur reddish-yellow-grey; legs red-yellow. Size small.

*Canis griseus*, Gray, P. Z. S. iv. 88, 123, t. 6; Mag. N. H. 1837, p. 578.

*Vulpes griseus*, Gerrard, Cat. of Bones of Mamm. 88.

*Canis (Pseudalopex) griseus*, Burmeister, Faun. Bras. 28, 48, t. 25.

*Hab.* Patagonia (*King*).

3. PSEUDALOPEX MAGELLANICUS. Colpeo. B.M.

Fur fox-red; back blackish. Large-sized.

*Canis magellanicus*, Gray, P. Z. S. 1836, p. 88; Mag. N. H. 1837, p. 578; Darwin, Zool. Beagle, x. t. 5; Burmeister, Fauna Bras. t. 6. f. 3.

*C. (Pseudalopex) magellanicus*, Burm. Fauna Bras. 24, 51; Reise La Plata, ii. 405; Wieg. Arch. 1862, p. 329.

*C. cancrivorus americanus*, Burmeister, Fauna Bras. t. 27 (skull).  
*Vulpes magellanicus*, Gray, Mag. N. H. 1836, p. 578; List  
 Mamm. B. M. 61; Gerrard, Cat. Bones of Mamm. 87.

? *Canis azaræ*, Waterhouse.

? *Colpeo*, *Canis colpaceus*, Molina.

? *Canis tetradactyla*, Meyer.

*Chile Fox*, Shaw, Zool. 329.

*Hab.* Chili and Bolivia (*Bridges*); Strait of Magellan (*Darwin*).

In the British Museum there are skulls from Chili, marked 184 *a, c*, and 184 *f*, *Vulpes magellanicus*, which are those of adult animals, and have a linear crest extending the whole length of the crown.

There is another skull, evidently from the same series, no. 184 *e*, also without any skin belonging to it, which has its adult teeth, but is not so large or aged as the others. It has a broad flat crown (separating the temporal muscles), which is wide in front and tapering to the occiput; and the side margins are rather curved in, giving it a slightly vase-like form. Length 5 inches 7 lines, width 2 inches 11 lines.

There are also a skull and skeleton (no. 184 *b*) from Chili, of which the skull is intermediate in size between the larger skulls and the small one. The coronal crest is linear; but there is an indication of the vase-shaped crown-plate on each side of the central ridge.

Nos. 817 *a, b, c, d, e* are five smaller skulls, named *Vulpes azaræ*, sent from Bolivia by Mr. Bridges. They are very similar externally, but they vary considerably in the size of the upper tubercular grinders as compared with the other teeth, and slightly in the form of the lobes of the upper sectorial tooth. The hinder upper tubercular is always of the same form as the penultimate, but smaller. The internal lobe of the sectorial tooth of *V. magellanicus* from Chili, 184 *e*, is rather larger, with the front edge on a level with the front edge of the body of the tooth; in the small skulls from Bolivia the lobe is very slightly in front of the line of the fore edge of the tooth.

I believe these all belong to one species; and they are very like the skulls figured as *Canis crancrivorus*, var. *brasiliensis*, by Burmeister, Fauna Bras. t. 27. They are very different in the form of the crown and other details from the skull figured as *C. azaræ* by Blainville, Ostéogr. t. 4, and by Burmeister, Fauna Bras. t. 28. f. 4.

#### 4. PSEUDALOPEX ANTARCTICUS.

B.M.

*Canis antarcticus*, Shaw, Zool. i. 331; Desm. Mamm. 199; Gray, List Mamm. B. M. 59; Darwin, Zool. Beagle, ii. t. 4.

*Antarctic Fox*, Penn.

*Hab.* Falkland Islands.

#### 5. PSEUDALOPEX GRACILIS.

*Canis (Pseudalopex) gracilis*, Burm. Reise La Plata, ii. 406; Arch. Naturg. 1862, p. 130.

*Hab.* Pampas of Mendoza.